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Safety Maintenance

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Vol. 122, No. 2 **August, 1961**

EDITORIAL

Lip Service Is Not Enough 2

ACCIDENT PREVENTION

Facing the Fallout Fear 5
Foundry Work Can Be Safer 7
(protective clothing series)
Safety Program Saves 9
by JOSEPH M. GOEWY
The Only 24-Hour Job 11
Electrical Hazards Are More Than Shocking! 12
by DAVID BAGDAN
Keeping Up With Materials Handling Developments 22
(materials handling series)
Steel Scaffolding Safety Rules 56
New Accident Prevention Bulletins 33
New Accident Prevention Products 63

FIRE PROTECTION

The Fire Front 31
Not Enough Water for Fire? 37
Tame the Fire Hazards of Painting: Part I—Spray Booths 38
by FRANK R. PITT
New Fire Protection Bulletins 33
New Fire Protection Products 63

INDUSTRIAL HYGIENE

Industrial Hygiene News 47
Monograph #1: Hydrogen Sulfide 48
by MARK M. LUCKENS
The How of Noise Control 50
(noise control series) by WILLIAM F. GLASER, JR.
New Industrial Hygiene Bulletins 33
New Industrial Hygiene Products 63

MAINTENANCE

Maintenance News 55
Steel Scaffolding Safety Rules 56
Clean As a Missile! 59
New Maintenance Bulletins 33
New Maintenance Products 63

SPECIAL DEPARTMENTS

The Future Shows 3
Another Injury Checked 15
A Salute to a Safety Idea 16
What's the Law? 18
The Safety Shelf 20
Loss Stoppers 33
Reader's Free Inquiry Card 33
What's Your Problem? 34
Achievements & Awards 45
Inside the Trade 61
What's New 63

Cover Picture by courtesy of Ohio Oil Company's "Beacon": Welding for production equipment and maintenance is important operation in oil fields.

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● LIP SERVICE IS NOT ENOUGH

Progressive and realistic management long ago accepted the challenge thrown down by accidents in industry. Such guiding spirits as the late Judge Gary, then head of U. S. Steel, foresaw the multiple advantages of a continuing crusade against the incalculable financial burden resulting from accidental injuries and fatalities. Through the years to the present untold millions of dollars have been invested in this safety crusade. This investment has paid off in countless lives saved, and no man knows what savings in money.

◀ ◀ ◀

Labor too has mobilized in the battle against tragic accidents which, at best, drain away the resources of the people who can least afford financial loss.

Through its Committee on Safety and Occupational Health, the AFL-CIO has prepared a down-to-earth booklet, "We're Promoting Safety in Your Local," for distribution directly to the grass roots of union labor. The giant labor organization acknowledges that for altogether too many years, too many wage earners have paid with their lives and their bodies and certainly with their savings as part of labor's bill for accidents. There is now widespread agreement that there can be no "Progress Through Tragedy!"

◀ ◀ ◀

The Committee sees a gigantic loss in the decade of the Sixties unless labor cooperates fully with management in a far more vigorous determination to reduce that ten-year loss which could take the lives of 150,000 wage earners, injure 20 million others and bring about a wage sacrifice of 10 billion dollars, despite benefits from workmen's compensation payments.

The accident-prevention appeal of the AFL-CIO pinpoints wage losses by reminding its members that no workmen's compensation benefit plan on earth equals 100% of wages. Therefore a "little" injury which does not cost a life, a limb or eyesight but only temporarily keeps the victim at home—even that minor injury eats away the family funds.

◀ ◀ ◀

An excellent example of the "You Can't Win" approach to accidental injury is cited to union members. If the member worker in the farm machinery industry lived in Illinois and earned $90.00 per week, the maximum workmen's compensation payment for a temporary injury would be about $39.00 per week. With an average lost time of just 18 days or 2½ work weeks, lost wages would reach a figure of $225.00, against which compensation payments would be paid in the amount of $97.50. The net loss for this average temporary injury case for the period would be $127.50. Are there many wage earners who can afford this loss? In some states, the maximum weekly workmen's compensation benefit is around $30.00.

In its realistic approach to safety participation of union members, the organization asks, "Since you can't prevent the losses, why not prevent the accidents?"

◀ ◀ ◀

It is encouraging to note that organized labor recognizes it cannot do the safety job alone. Accidents can be prevented only through the vigorous cooperation of all concerned and the ready embrace of all rules and regulations designed to protect lives as well as property. Lip Service alone is not enough.

▶ ▶ ▶

THE FUTURE SHOWS

Poland Spring, Me. *Aug. 31–Sept. 1*

Thirty-Fourth Annual Maine State Safety Conference (Poland Spring House). Arthur F. Minchin, Secretary, Dept. of Labor & Industry, State House, Augusta, Me.

Greensboro, N. C. *September 12–14*

Third Annual Southeastern Plant Maintenance & Engineering Exposition (War Memorial Coliseum). John Harden Associates, P. O. Box 3173, Greensboro, N. C.

New York, N. Y. *September 25–28*

Second Industrial Building Exposition & Congress (Coliseum). Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Philadelphia, Pa. *September 26–28*

Sixth Annual Sanitation Maintenance Show (Hotel Sheraton). Leonard S. Rogers, Manager, Sanitation Maintenance Shows, Inc., 310 Lexington Ave., New York 16, N. Y.

Houston, Tex. *October 10–12*

Twelfth National American Standards Association Conference. American Standards Association, 10 E. 40th St., New York 16, N. Y.

Chicago, Ill. *October 16–20*

Forty-Ninth Annual National Safety Congress & Exhibition (Headquarters at Conrad Hilton Hotel). R. L. Forney, Secretary, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Pensacola, Fla. *October 27–29*

Florida State Industrial Nurses Association Convention (Holiday Inn). Mrs. Aileen Liberis, R. N., Northwest Fla. Ind. Nurses Association, 8 North G St., Pensacola, Fla.

Washington, D. C. *March 6–8*

1962 Biennial President's Safety Conference on Occupational Safety. Bureau of Labor Standards, Dept. of Labor, Washington 25, D. C.

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FACING The FALLOUT FEAR

Devices approved by Civil Defense authorities make fallout and radiation exposure *known* quantities.

The Industry Office of the Office of Civil and Defense Mobilization has noted a marked increase of interest in fallout radiation measuring instruments. These inquiries have primarily centered about:

1. equipping industrial radiation monitoring teams, and

2. the availability of instruments for use by employees at home and for general public use.

Many industrial and business firms throughout the country have organized and trained radiological monitoring teams. These teams, generally, have been integrated into the local civil defense radiological detection and measurement organization. Such integration helps achieve radiological defense capability in the community.

Courses on radiological defense are given at the OCDM Operational Headquarters at Battle Creek, Michigan; Eastern Instructor Training Center, Manhattan Beach, Brooklyn, N. Y.; and the Western Instructor Training Center, Alameda, Calif. Two courses are conducted at each location; they are (1) Radiological Monitoring for Instructors (for individuals who will organize and train monitoring teams) and (2) Radiological Defense (an administrative course for executives and civil defense directors).

OCDM has set up the essential and desirable specifications for radiation measuring instruments for the public—frequently termed "citizens' instruments."

OCDM advises that, as a supplement to organized Federal, State, and local monitoring systems, every home, business and community shelter should have an instrument to measure radiation dose rate—a ratemeter. In the event of nuclear attack, such an instrument should provide information that will help the user determine the degree of fallout danger he faces, and help him make logical decisions for greater safety. For example, a citizen's radiation instrument should help the user determine when to take shelter, when to leave the shelter, and how long it would be advisable to remain in an unprotected area. The instrument also should be of value in locating that portion of the home or protective structure which offers the best protection from fallout.

In addition to a ratemeter, an instrument which measures total radi-

ation dose (a dosimeter) would be useful in keeping track of accumulated radiation exposure over a long period. A reasonable range for a citizen dosimeter is 0-600 r.

An instrument which gives only an alarm that radiation is present is not adequate.

Simple instructions for measuring radiation should accompany each instrument.

Guidelines showing how to make the most effective use of citizens' instruments are being developed. These guidelines would be of particular value in an emergency if transmission of specific directions from radiological defense authorities should be disrupted.

Essential Characteristics

Citizens' dose rate measuring instruments should have the following general characteristics:

1. **Provide quantitative information.**
2. **Be simple to operate.**
3. **Be dependable.**
4. **Be low in cost.**
5. **Indicate dose rate directly, or provide an indication which can be converted easily to dose rate (e.g., calculating dose rate by timing a measurement of dose).**
6. **Be portable, and usable both inside and outside a shelter.**

Desirable Characteristics

In addition to the essential characteristics, it is desirable that these instruments:

1. **Use simple batteries (e.g., flashlight-type "D"), or if possible, no batteries.**
2. **Have infinite shelf life.**
3. **Be easy to calibrate.**
4. **Be accurate to within ±35 percent.**
5. **Be energy independent—able to detect a wide range of radiation energies equally well.**
6. **Have scale reading unaffected by the instrument's position.**
7. **Have a positive operation test —a method to make sure the instrument is working.**
8. **Have a range of 1 to 100 r/hr.**
9. **Be fail-safe.**

Instruments having all of the essential and most of the desirable characteristics described are commercially available. Other instruments, designed in keeping with these characteristics, are being developed.

Approved Kit

One radiation measuring kit, approved by OCDM for use by the general public, includes:

1. *A dosimeter-ratemeter* designed to measure and indicate radiation dose rates in two ranges, 0-120 roentgens per hour (r/hr) requiring a one-minute exposure interval, and, for increased accuracy of reading, 0-12 r/hr requiring a 10-minute exposure. This instrument is a quartz-fiber device similar to self-reading dosimeters in common use, except that it has special scales to assist in direct reading of dose rates after fixed timing intervals. It must be reset each time a reading is made. However, since it has no self-contained source of energy, such as batteries, an auxiliary charging device is required. The charger (See #3 below) was specially designed for this purpose, or the standard operational dosimeter charger also may be used. The dosimeter-ratemeter may be procured in combination with the charger.

2. *A dosimeter* designed to measure and indicate the total accumulated radiation exposure in the range 0-600 roentgens. This instrument is a quartz-fiber device similar, except for range, to other self-reading dosimeters in common use. It does not have to be reset each time a reading is made and should require resetting only at infrequent intervals. It does not contain its own energy source. Like the ratemeter above, it may be charged on an instrument designed specifically for this purpose or on the standard operational charger.

3. *A charger* designed to pre-set the dosimeter-ratemeter and the dosimeter to zero before use. This charger also will charge most other quartz-fiber dosimeters. It uses one standard flashlight battery for a source of power.

Safety Engineers Elect "Fellows"

Eight members of the American Society of Safety Engineers have been elected *Fellow* for the first time in the Society's history. Fellows are selected for their outstanding contributions to the safety engineering profession.

The eight honored at the meeting of the Society's executive committee meeting in Chicago are:

Robert H. Albisser, safety manager, Merck & Co., Rahway, N. J.

Fred H. Braun, vice president—accident prevention, Employers Mutuals of Wausau, Wausau, Wis.

John A. Dickinson, safety consultant and former chief of the Code and Specifications Section, National Bureau of Standards, Washington, D. C.

Herbert William Heinrich, chairman, Uniform Boiler and Pressure Vessels Society, New York, N. Y.

Arthur J. Naquin, safety counselor, New Orleans Public Service Co., New Orleans, La.

Clyde C. Ruddick, manager, safety and plant protection, Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Samuel E. Sharp, director, Safety Engineering Dept., Tennessee Copper Co., Div., Tennessee Corp., Copperhill, Tenn.

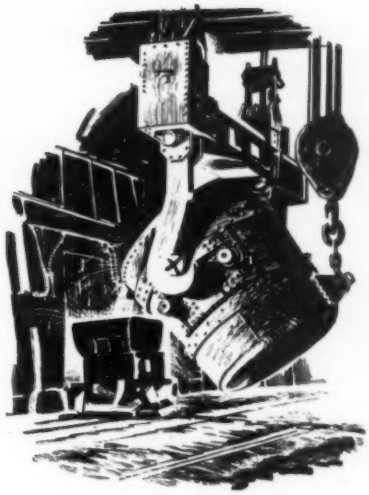
Joseph C. Stennett, manager, accident and fire prevention, National Association of Mutual Casualty Cos., Chicago, Ill.

The Fellow classification is a recent innovation for the American Society of Safety Engineers, following in the tradition of other professional engineering and scientific societies. Members must be nominated by their colleagues and fill a number of other requirements before being considered for the honor.

The American Society of Safety Engineers, with headquarters in Chicago, is celebrating its 50th anniversary this year. It was founded in October 1911 in New York City. At present the Society is made up of approximately 7,300 members engaged in professional accident prevention work. The Society has 76 chapters throughout the U. S. and in Canada.

Worker is protected in pouring operation: safety clothing, hard cap, goggles, gloves, leggings, safety-toed shoes.

FOUNDRY WORK CAN BE SAFER



The variety and complexity of operations in a typical foundry carry with them an equally wide range of potential dangers for the workers.

At the same time, a great deal of progress has been made in creating safer conditions in this industry and in the provision of equipment designed to protect the worker against every foreseeable hazard. Safety authorities are generally agreed that even further progress is assured if safety-conscious management and employees push the fight for adequate protection at every stage of foundry operations.

The following is an outline of the principal types of hazards facing the foundry worker and the essential equipment available for his protection.

Foundry Yard

Here the employee is faced with dust conditions, flying particles, falling objects, and dangers from overhead cranes, moving cars, and improper piling.

He should be equipped with metal-reinforced leather gloves and hand pads; with hard-toe shoes or metal toe guards; and with a safety hat. Against air-borne hazards, he should wear a dust respirator or metal fume respirator. For face and eye protection, he needs impact goggles or welders' goggles. And where fuel leakage is a problem, test equipment should be available to check for carbon monoxide or combustible mixtures.

Molding Section

Dust conditions will be most prevalent during molding, finishing,

PROTECTIVE CLOTHING SERIES
other articles Sept. & Oct.

Prepared by

INDUSTRIAL SAFETY EQUIPMENT ASSOCIATION, INC.

and handling. There will be flying particles. There will be fuel leaks from hand torches. And the worker will be constantly handling rough and jagged materials.

Employees in this area should never be without chrome leather gloves or hand pads, and hard-toe shoes. They will need respiratory protection; impact goggles and face shields; and test equipment to check against combustible gases.

Core Making and Baking

Hazards in these operations will lie largely in the area of skin irritations, flying particles, burns from hand torches, and fuel leaks.

Hard-toe shoes, impact goggles, and face shields are essential safeguards for certain operations. First aid equipment for treatment of burns should be readily available. Test equipment for combustible gases is desirable.

Melting Section

There will be hazards peculiar to the charging, melting and handling operations. Chiefly they will be dust conditions, heat exhaustion, carbon monoxide concentrations, metal splashes, eye injuries, and exposure to high radiant heat.

Workers in this area will require a great variety of equipment: chrome leather aprons, gloves, leggings, and spats; safety belts; dust and metal fume respirators; air line respirators; impact goggles, face shields, and melters' goggles; first aid equipment for burns and heat exhaustion; and instruments for the measurement of dust concentration and carbon monoxide.

Pouring Section

Metal splashing and high radiant heat are the principal offenders in this operation. But there will also be dangers from carbon monoxide from organic binders; dust on molds; metal fumes in bronze and brass foundries; and contaminated air conditions for cranemen.

For protection, workers should be equipped with chrome leather aprons, gloves, leggings, spats, and hard-toe shoes. Dust, metal fume, and air line respirators are an absolute necessity for certain employees. First aid equipment for burns and heat exhaustion should be available. And there should be instrumentation to measure CO concentrations and to survey dust hazards.

Shake-Out Operation

Experience has shown that the greatest number of foundry accidents occur in this area. There are extreme dust conditions combined with excessive heat. There are dangers from flying particles, falling objects, and from sharp, jagged materials.

"THEY ALL MISS YOU DOWN AT THE PLANT, ESPECIALLY ME. I'M DOING YOUR WORK!"

Chrome leather aprons, hand pads, gloves, hard-toe shoes, and metal toe guards provide excellent barriers against bodily damage. Dust respirators and respirator hoods are essential. So are impact goggles and face shields. Salt tablet dispensers are needed to guard against heat exhaustion.

Other Hazardous Areas

Similar hazards can be found in all other areas of foundry operation: cleaning and finishing; heat treating; inspection; machine shop; and shipping. For each specific danger, there is equipment available that, properly used, will prevent injury and save lives.

Picture by courtesy of U. S. Steel Corp.

New Hazards Require New Safety Controls

New and more effective methods of accident control must be developed if industry is to produce safely the thousands of new products being introduced each year, an accident-prevention specialist told 600 delegates to the Wisconsin River Valley Safety Conference. C. F. Schlueter, manager of accident prevention for Employers Mutuals of Wausau, examined the future challenges offered by rapidly expanding manufacturing processes.

The 30th annual meeting was keyed to the theme, "The Golden Anniversary of Safety." Organized safety programs are considered an outgrowth of state workmen's compensation laws. The Wisconsin law, first constitutional workmen's compensation law in the United States, is celebrating its 50th anniversary this year, having gone into effect September 1, 1911.

Schlueter told his listeners that "a careful look at the past reminds us that new hazards always have been a part of progress, and that new hazards always tend to cancel out success with old safety programs."

He noted that there always has been some lag between the introduction of new products and the development of adequate safeguards for those who put the materials and methods into use. "But this gap has been reduced significantly where modern safety programs have been adopted by industrial firms," Schlueter said.

He used these illustrations to point out the historic lag of safety behind inventions:

- Glass was first made in Egypt in 2500 B. C.—but it wasn't until 1903 that a Frenchman perfected safety glass.
- Fire was first made by man about 4000 B.C.—but it wasn't until 1855 that a Swede perfected the safety match.
- Man has used razors for centuries—but it wasn't until the early 1900's that the safety razor was introduced.
- The pin goes back several centuries—but it wasn't until 1869 that

(Continued on page 30)

Safety Program ave

by **JOSEPH M. GOEWEY**
Director, Institutional Safety Services
New York State Department of Mental Health

The safety and fire problems of the New York State Department of Mental Health are a complex combination of those found in hospitals, industry and local government. The Department's safety program has cut Workmen's Compensation unit costs by one third.

The New York State Department of Mental Hygiene embraces a vast complex of 27 institutions throughout the state from Long Island to Lake Erie and from the Southern Tier to the St. Lawrence River. At these institutions there are approximately 39,000 employees, and in addition several hundred departmental employees in the central office at Albany and at many other locations such as at aftercare clinics, child guidance centers, research facilities and at the correctional institutions. The department institutions are composed of hundreds of buildings of every size, construction and description from small dwellings to gigantic multi-storied hospital buildings; from buildings over one hundred years old to those of new, modern fire resistive construction.

Broad Range of Hazards

Nearly every institution in itself is a large complex of buildings, grounds and roads. Many of our buildings, such as our medical-surgical buildings, continued-treatment buildings, power plants, laundries, bakeries and industrial shops, carry on much the same operations as the largest general hospitals, hotels, commercial laundries, bakeries and other large business and service establishments. Nearly every conceivable type of operation is carried on, and experienced employees in these operations are all part of the departmental personnel.

To furnish safety services the department and its institutions have a staff of over 450 safety officers and safety supervisors with all types of equipment, including motorized fire apparatus, safety patrol cars and safety and fire protection equipment.

How the Safety Program Started

The history of the safety program goes back many years. A concerted effort was made in the late 1940's to compile information on all state employee accidents and visit the departments involved from a safety standpoint. In 1949 the New York State Division of Safety in Albany asked all state departments and agencies to send representatives to an organizational safety meeting. The outgrowth of this meeting was the New York State Employee Safety Program which got under way in 1950. A safety administrator was appointed in each department and agency to administer the safety program, and a safety supervisor was appointed in each departmental division, district and institution.

At the same time that the New York State safety program was

evolving, a second and independently-arrived-at program of reclassification of supervisory police and fire positions as safety supervisors at the Mental Hygiene institutions was also being undertaken. These newly designated safety supervisors were given concurrent responsibility for the state employee safety program in their respective institutions. In 1951 a full-time safety consultant was appointed in the Department of Mental Hygiene. He was charged with the responsibility of planning, organizing and directing a large safety and accident prevention program in the department, embracing accident prevention, fire prevention and protection, patrolling and traffic activities, and the handling of any disaster or emergency which might arise.

It was recognized in the early stages of the program that safety is a separate service in the organizational structure of the department, on a level with other important services, and reportable to the commissioner of the department through an assistant commissioner. In our own department, the safety services are in the division of inpatient services under the general administrative supervision of the assistant commissioner in charge. At the institution, the safety supervisor reports to the director or administrative assistant director.

Program Coverage

Individual programs making up the safety services are the accident and fire investigating and reporting precedures; accident and fire summary and analysis program; safety education program; safety standards program; the fire and safety equipment program (including a program of replacing unsafe equipment in all areas); hospital operating suite safety program; machine guarding program; fire control and evacuation program; safety and fire inspection program; safety training program; window cleaning safety program; traffic control and parking program; state-owned motor vehicle safety program; disaster control program and radiological safety program, to mention only some of the more important programs.

Many of these programs are carried on in conjunction with, or with the assistance of, other state departments and agencies, such as the employee safety program. While there is occasional debate as to which of these programs may be more important than others, prevention is emphasized while continuing and improving the protection aspect of such safety services.

Officers' Duties

In line with this philosophy the department took the next logical step of reclassifying institution firemen and institution patrolmen to *institution safety officers.* On April 1, 1957 this reclassification was completed and the department's safety consultant was reclassified to *director of institution safety services.*

The combined duties of the institution safety officer include, on an assigned shift, participating in the general safety program; inspecting, testing, maintaining in proper working condition and operating fire fighting equipment such as fire pumps and pumpers, ladders and ladder trucks, standpipe hose, extinguishers and sprinklers; assisting in putting out fires; investigating fires and accidents; participating in fire drills and in the safety training program; making safety and fire prevention inspections throughout the institution and reporting hazards; patrolling the institution grounds either in a patrol car or on foot to maintain order, protect property and prevent trespass, theft or damage; reporting violations of police, fire and safety regulations and testifying when required; assisting in emergencies and in searching for escaped patients; directing traffic and parking and giving information and assistance to visitors. Such duties also may include responsibility for a piece of motorized fire apparatus; for the operation of the safety headquarters and receipt of fire signals or other calls; for some phase of the accident control or fire prevention program and, at times, of serving as assistant or acting supervisor.

Obviously, all safety officers are not doing all of these things all the time, but the integration program has permitted more flexible schedules of operation. The older safety officers are given much consideration in continuing the duties for which they were most experienced, realizing that some were not adapted for both police and fire duties. The newer, and particularly the newly appointed, safety officers are expected to take appropriate training in all phases of this safety program and be available for any safety duties the occasion may require.

Program's Savings

It should be noted that the Workmen's Compensation cost for the 1951–52 fiscal year at the beginning of this program reached an all-time high of approximately $27 per employee. Since that time the number of employees has continued to rise along with the general cost of living. It is, therefore, conceivable to believe that had there been no safety program, the departmental Workmen's Compensation cost would have continued to rise and the figure would now be well over a million dollars per year. However, in the face of this picture of increases, *our Workmen's Compensation costs started to go down and continued a downward trend.* The cost per employee for the 1958–59 fiscal year was approximately $18. It should be stated that during this period the work-week dropped from 48 hours to 40 hours, a drop of one-sixth. However, the Workmen's Compensation cost per employee dropped about one-third.

All institutions are not following all programs to the same degree and we cannot and do not expect our safety personnel to be experts in all phases of safety. Our ultimate goal is to become familiar with and be prepared to undertake and administer any present or future program related to safety and, above all, be prepared to handle any emergency which may arise.

PORT-O-RUNG
U. S. Patent 2,945,549
Foreign Patents Pending
Auxiliary rungs to replace any rung, and any number of missing rungs, in all permanently installed upright ladders.
GAGNON ENTERPRISES
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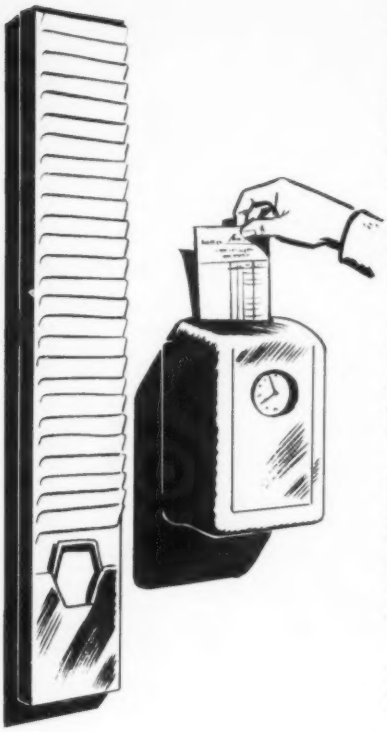


THE ONLY 24-HOUR JOB

Industrial workers tend to let down their safety standards unconsciously when they step out of the plant according to Robert D. Lilley, vice-president of the Western Electric Company, who urged that industrial safety be made a 24-hour job. Speaking before a company-wide conference of 75 Western Electric's safety specialists and industrial relations representatives from 13 major manufacturing locations, Mr. Lilley said that supervisors should help create accident prevention awareness at all times.

Mr. Lilley reported that Western Electric achieved last year the best on-the-job safety record in its history, with less than one disabling injury for every million man-hours worked by the 136,000 employees of the Bell System's manufacturing and supply unit. In contrast, there were eleven and a half accidents to Western Electric people away from work for every one that occurred on the job.

"But the charts don't reveal the pain and discomfort of the injured employees, medical and hospital expenses, damage to or loss of property, added insurance costs," Mr. Lilley noted.

He pointed out that a worker's lapse into preoccupation often is the forerunner of accidents that take place both on and off the job.

"I am sure there is an unconscious let-down when we leave our jobs at the end of the day," Mr. Lilley added. "We do not consciously or conscientiously make safety a 24-hour job."

Observing that supervisors could help create an "aura of awareness," he said a safety program should begin with their "constructive interest in the individual safety of every one of our employees and our employees' families."

Motivation of the individual was described as the starting point for communicating safety ideas by Walter M. Reynolds, Western Electric's public relations director. "The individual must want to have no accident, and want it so badly that he will, himself, take the action necessary," he said.

Dr. Edward J. Schowalter, the company's general medical director, presented a program for off-the-job safety that would expand safety education and promotion of good safety practices for employees and their families. He also proposed that employees be encouraged to participate in community safety activities.

"As an example of safety education," he said, "there were six instances last year where Western Electric employees saved lives off the job by using mouth-to-mouth artificial respiration, which they had learned through company educational efforts."

An award of merit for "noteworthy safety performance" in reducing accidents in its plants was presented to the company by Gen. George C. Stewart, executive vice-president of the National Safety Council. During 1960 Western Electric people suffered less than one disabling injury for every million man-hours worked.

It was the excellent accident prevention record at work that drew the company's attention, by contrast, to the problem of accidents occurring to employees and their families off the job.

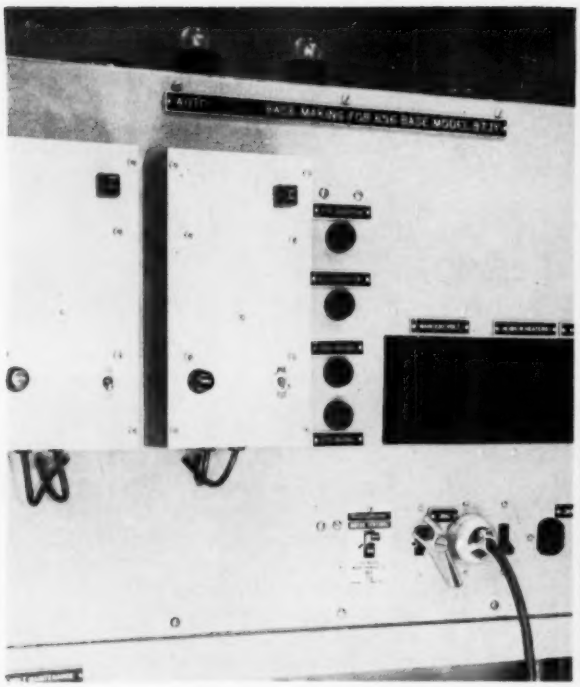
H. I. Romnes, president of Western Electric, accepted the plant safety award, and pledged the support of the company's top management to the program for alerting employees to safety off the job as well.

He suggested that educational techniques used successfully to control accidents at work could result in dramatic gains when applied to off-the-job accident prevention. Supervisory and safety officials of the company can help convince people that "luck" plays no part in most accidents, which can be controlled like other human events, he said.

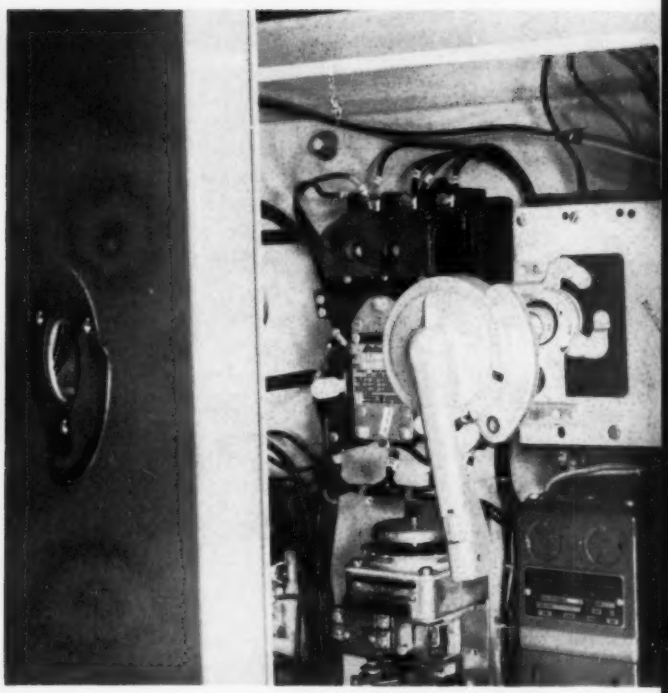
"The rewards may not be immediately apparent, either to employees or the company," Mr. Romnes added, "but I can almost guarantee they will be there at some future date like an accumulation of money in the bank. I think the goals of a safe, sound Western Electric population and a contribution to the reduction of our national accident toll are worth our very best efforts."

Details of the company's off-the-job safety program were outlined by Charles R. Bergmann, personnel director, who said safety committees would be formed among employees at factories and other company installations. Safety information will be exchanged between plants and reports of off-the-job accident experience will be published regularly, he said. The company's headquarters will be notified of all serious accidents. "Safety packages" of pertinent literature, posters and other material are under consideration and the com-

(Continued on page 44)



While lever of de-energizer prevents false starts during adjustment, cord control allows mechanic to start machine.



To open door, this safe, yet non-restrictive, breaker must be turned off. It may be reset for open maintenance.

Electrical Hazards Ar

by **DAVID BAGDAN**
Section Manager
Equipment Engineering: Electrical
Westinghouse Electric Corp.
Bloomfield, N.J.

Whom are you going to kill with your next piece of electrical equipment?

If you thought electrical equipment were really that dangerous you would scrutinize every feature of design for safety. But why shouldn't you anyhow? Even though fatalities are fortunately rare, there are many possibilities for injuries from electrical equipment, and many of them could be serious.

Electrical "equipment" includes custom or standard production facilities to make products; appliances such as washing machines, electric ranges or entertainment units; and equipment which is primarily mechanical yet uses electrical components as controls or accessories. All signs point to the 60's being a decade of fantastic electric progress. Electricity will be used for purposes never tried before and often by people unfamiliar with the hazards.

Many tasks now performed personally—the dull monotonous, the dangerous, the complex or highly skilled—will soon be accomplished with the help of electrical devices and controls. In fact some operations now impossible by humans due to speed, precision, hazards, etc., will be easy electrically.

But some of the equipment for these things will be so complex, that in the zeal to accomplish ingenious results the starkly important matter of safety may be overlooked. When we consider the increasing number of people who will use, maintain, and live with electrical equipment, all of us must make sure that the designs are as safe as possible.

It is hoped that these reminders, familiar as they may be, will help guide those responsible for safety in equipment.

Shock Hazards

Almost any voltage can cause a shock. While tightening a battery cable on a 6 volt battery, I was getting a jolt so painful that I kept dropping the wrench. I normally can hold 220 volts with my hands. It developed that a sliver of steel wool was imbedded in my finger and that the 6 volts was enough to stimulate a nerve excruciatingly.

For three to five days a month many women become ultra-sensitive to low voltages. A shock during those days while they are more high-strung than normally can be very upsetting.

Although these low voltage shocks are seldom fatal, *they are still very dangerous* due to the possibility of accidents from "jerk-back." A person can step back into the path of a moving truck, lose his balance on a ladder, or rip his flesh on a tool as he pulls back his arm. *All shocks are dangerous.*

To prevent shocks at least three precautions are necessary: **positive grounding, complete guarding of live metal, and interlocking of all access doors, gates, and panels.**

Positive grounding is one of the hardest safety measures to enforce.

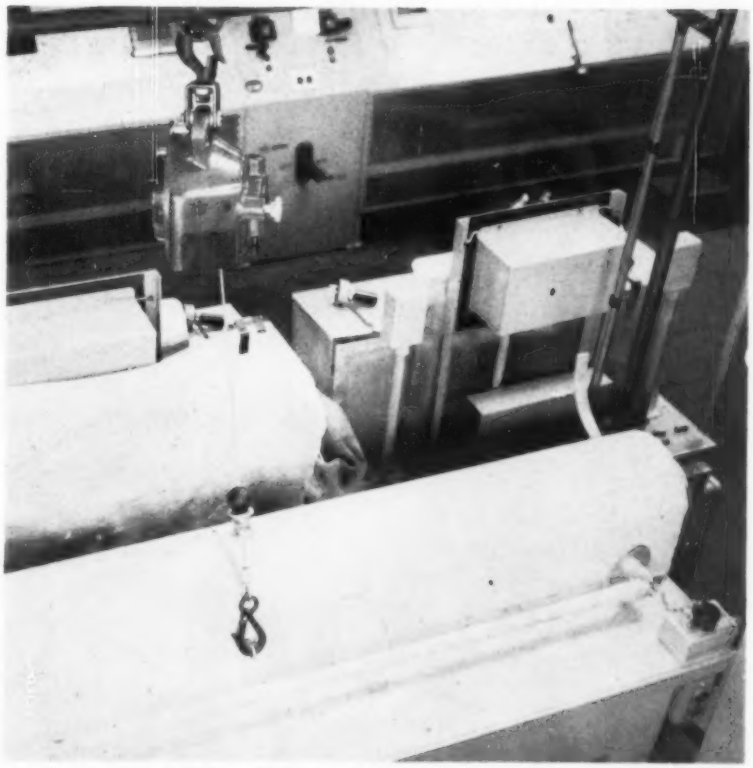
- How can electrical equipment cause burns, cuts, internal injuries, sight and hearing damage?
- What is the "knuckle" test for charged equipment?
- Why are low-voltage shocks dangerous?
- If you can't guard a "live" metal part, what should you do?
- Why does vibration cause fires in electrical equipment?
- What can you do in an electrical emergency when all else fails?

More Than Shocking!

Expense-wary supervisors are prone to point out that machines already have pipes or other metal connections which tie them to earth. *These are not good enough.* The pipe or other metal may be discontinuous somewhere or may be removed "temporarily," etc. Sure, it's only "one chance in a million" that such things will happen—but when you've seen men "hang-up," despite those odds, and life depends on complete precautions, all machines using **ANY** electricity, even if only a light, should be properly grounded. The sizes of the copper conductors are prescribed by the National Electrical Code.

Portable Tool Grounding

Portable tools and plug-in devices cannot usually be permanently grounded, but their cords can and **must** include an extra wire for grounding during use. Unfortunately, the warnings to do this are the most flagrantly ignored. During a recent inspection at one plant over half the portable drills in the tool crib were found to be elec-



Shown is positive disconnect device. When currents to be intercepted are too large for standard switches, heavy plug disconnects for positive separation.

trically dangerous. Yet some of the most vehement arguments ever expressed were by a mechanic sitting astride a large motor, his trousers drenched with perspiration, pressing an ungrounded drill with his chest. A more perfect opportunity for fibrillation could not be imagined. Fibrillation is the uncoordinated contraction of the heart muscles making it useless as a pump. It is most likely to occur when current is fed across the heart with two parts of the body exposed to voltage. It is a very dangerous form of shock. *Grounding is important.*

Guarding of Live Metal

All metallic parts that are directly or indirectly connected to live circuits must be covered or guarded so that operators, customers, or other users cannot touch them. Even maintenance personnel should be protected from touching live parts if possible. When impossible, live parts should be painted yellow and labeled clearly as being "live."

Interlocked Doors

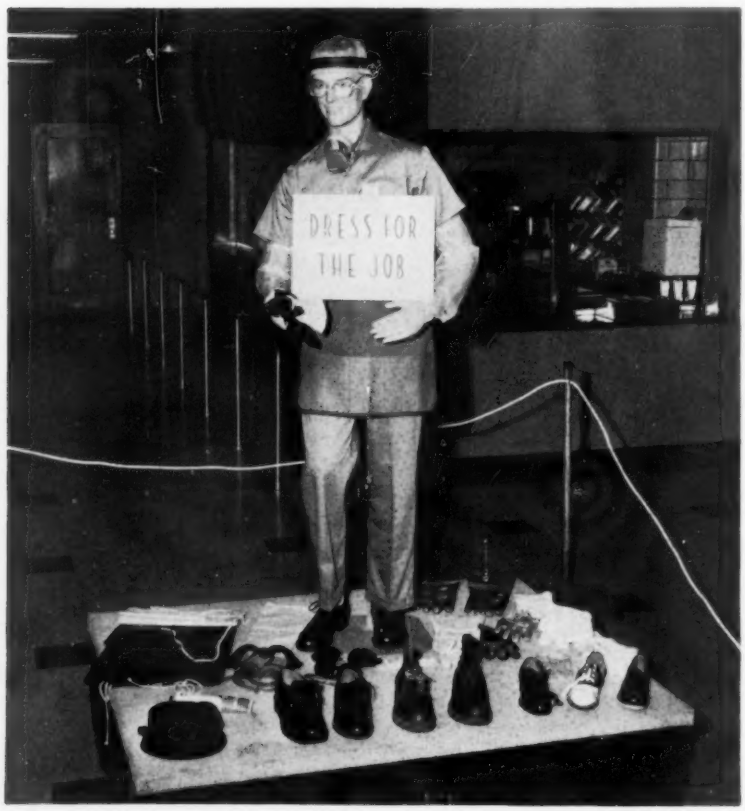
When it is necessary to gain access to deenergized parts which are live during normal operation, the doors, gates, guards, etc., should be furnished with switches that will disconnect power when opened. This is often required when operators must load parts to be tested or maintenance people must service equipment.

The only safe type of door switch is one that completely separates and interrupts power directly. Switches that depend on springs or gravity to open are not dependable enough when life is at stake. They stick sometimes for the most unpredictable of reasons.

Often, when currents of over 10 amperes are to be interrupted, there is a strong temptation to use merely the door switch to disconnect a large relay or contactor. This is very dangerous as the relay, contactor, etc., may stick in the "on" position due to binding, "frozen" or pitted contacts, or residual magnetism. This last cause may seem to be too weird to expect, but it has happened twice in one week on a test set where it had never happened in the previous three years.

When opening a door is expected to interrupt currents larger than standard door switches can handle, it is often possible to use heavy plugs. They can be used with heavy cables so arranged that one must detach the plug from its socket in order to open the door or gate.

One of the nastiest electrical hazards is that of charged capacitors or condensers. Good ones will hold charges a long time and are often difficult to discharge completely. As a young technician, I learned this the hard way. A high power rectifier had broken down. As prescribed, I stroked the cases of the capacitors with a grounding rod. Then as it would be necessary to use those capacitors to brace myself, I wanted to make sure they were completely discharged. It's good I knew something about muscular contraction. During shock all the muscles involved tighten. That's why a person holding a wire in his palm cannot "let go." On the other hand, testing for voltage with the back of the knuckles will cause the hand and arm to close but in such a way as to recoil from the source. When I checked the cases of the capacitors with my knuckles, the reaction was so severe it knocked me out of the rigging. Even though apparently discharged, there was enough residual charge to be serious.



More than 40 items of protective equipment available to Westinghouse employees are shown in this display. There are many more similar items not shown here.

Time Delay

Any capacitors over 5 microfarads must be regarded as dangerous. Provisions must always be made to discharge them before anyone can touch anything connected to them. If access doors are opened, the capacitors should be automatically shorted. One low cost method is to connect permanent bleeders across the capacitors and then use door fasteners that take so long to undo that the capac-

itors will be discharged in time. This hazard becomes especially significant with the growing popularity of power factor correctors. They are best safeguarded by letting the motors involved act as discharge devices once the power is disconnected.

No matter how many safety check lists one makes, one must still anticipate the unanticipated. Meters at high voltage must be behind windows so they can't be touched if they break down, cables should have the toughest sheaths possible so that they will not wear away and expose live conductors to the touch, guards should not be of perforated material with holes large enough to admit a finger. There's no formula for complete shock prevention except to think out every possibility and hope you've covered them all.

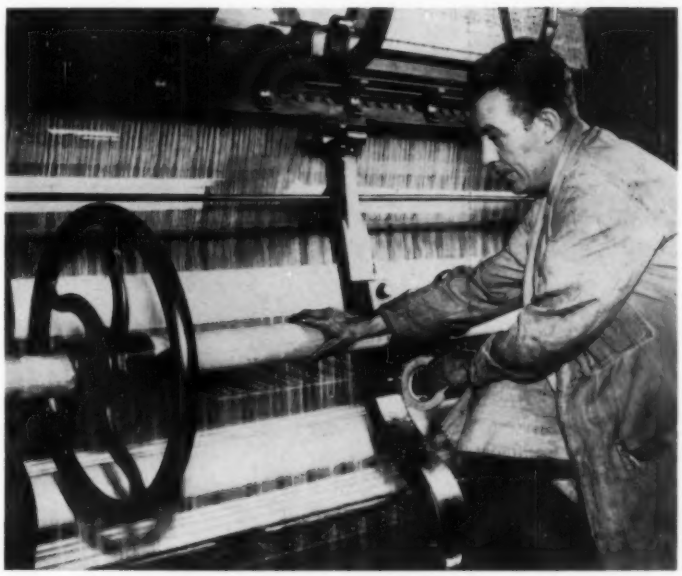
Fire Hazards

Many electrical fires are due to overheating. Whenever any electrical conductor carries a current larger than its rating, it overheats. This may happen when a motor is overloaded, a transformer short-circuited, or simply too many appliances connected to a pair of wires. Any one of them can cause insulation to ignite which may in turn cause serious flames in more flammable material, such as insulating oils, waxes, etc.

Most such fires can be avoided by using proper safety factors in design. However, a few causes of overheating are not too well known. Any kind of loose connection will result in generation of heat. I have seen lugs glow cherry red due to loose connections on heavy contactors at only 90 amperes. This is often possible on equipment exposed to vibration. Lock washers are essential in such cases. Fuse clips often overheat due to loss of temper and poor contact.

Solenoids must seat home completely. When the plunger is out, the current runs as high as 11 times normal causing 121 times normal heat to develop in the coil. Even a few thousandths gap will cause overheating. Mechanical designers protest at this limitation as it complicates linkages but it is necessary.

Another Injury Checked



Guard For Whirling Drive Shaft

Protecting the operator from the drive shaft of a lace machine—that was the problem facing the management of Nalpac Company. This firm, located in Montreal, Quebec, Canada, manufactures a line of fine laces. The lace machines have an exposed drive shaft which has been a hazard. This shaft had accidently caught and twisted the loose clothing of the operator resulting in his personal injury.

The solution proved to be a paper convolute tube. After a careful study, a fibre sleeve 3 inch I.D., slit full length, was selected. It was necessary for this tube to be ¼ inch larger in diameter than the shaft.

The fibre tube was supplied in master lengths of 8 feet and then cut to size on the job. The tubes were then fitted into sections between the hand wheels. Because of the slit, the tube can be slipped over the shaft and then taped. The tubes are reusable and easily removed.

Now if a person accidentally leans on the drive shaft, the tube will remain stationary. Officials of Nalpac feel that by using this inexpensive method of covering the drive shafts of their lace machines they have provided a safer operation without hindering the production of the machine.

Picture by courtesy of Sonoco Products Co. of Canada, Ltd.

Fires are also caused by arcs or sparks. These sparks can be caused either by unusual voltage jumping between too-close pieces of metal or by the pieces being forced closer together than normal, thereby causing the voltage to break down between them. If the sparks strike flammable material long enough to ignite it, serious fires may result.

Explosion Hazards

In our department whenever we release a design for equipment, we use a check list to make sure every

A Salute to

A SAFETY IDEA

Hearing Protected During Long Exposure to Low Intensity Noise

The physiological and psychological effects of long exposure to low intensity noise from ground support equipment for jet aircraft and missiles is now commanding the same attention that high intensity noise received during the early stages of jet aircraft operation.

At the National Aeronautics and Space Administration's Flight Research Center, Edwards, California, preliminary tests conducted among ground support equipment crews have demonstrated a need for adequate ear protection. Ground support crews at the flight center work continuous eight-hour shifts. During the shift they are exposed to noise levels ranging above 100 decibels.

Effects of Long Exposures

For extended periods of time exploratory tests among ground support technicians were instituted by Richard B. Cox, chief of the aircraft inspection section. Employees who had been exposed to the noise for the full shift period without ear protection showed an inability to concentrate and were short-tempered.

Using head-set type ear protectors, Cox found that most of the effects of long noise exposure were lessened considerably. The equipment is the same ear protection worn by aircraft maintenance crews at the NASA center. These crews are sometimes exposed to high intensity noise reaching 130 plus decibels.

One of the continuous ground noise problems is the high noise level of hydraulic pumps used in the hangars and under planes. Some of the equipment used to circulate hydraulic fluid runs steadily for extended periods before takeoff.

"Aside from our present noise problem from ground support equipment, we are well aware of the extent to which these noises will be amplified as larger and more powerful equipment is required to handle rockets and jet engines of progressively greater thrust," Cox explained.

Picture from Mine Safety Appliances Company.

eventuality has been considered. One of the items on it is "local atmosphere." This is a reminder to check for the presence of explosive gases, fumes or vapors. In modern processing the use of materials such as alcohol, benzine, lacquers, and other volatile solvents becomes more common every day. Flash fires and explosions are too often the result.

Ignition of such gases could be caused by sparks or arcs from any source. They are often due to poor contacts such as loose wire connections, frayed strands of wire, loose fuse clips, etc., or even to normal operation of switches, relays, plugs, etc.

The only protection possible in such cases is to use explosion-proof, Underwriters' Laboratory approved components or remove the controls to a location remote from the dangerous atmosphere. Incidentally, one can run controls very long distances at a reasonable cost.

Static Electricity: One of the most difficult sources of sparks to control is static electricity. It can be caused by rapidly moving belts, and also by high speed printing, packing, and stacking equipment. This is especially true when the material handled is highly glazed or otherwise coated to prevent moisture absorption. Sometimes it is very difficult to suppress this sort of static electricity, some of the standard methods previously effective being useless. It requires very special techniques. If experience is not available among your designers to handle static problems, it is readily available from those selling the commercial anti-static equipment.

Flesh Injuries

Burns: Usually the obvious sources of heat in equipment will be guarded to prevent burns. However, electrical equipment will, by its very nature, develop heat wherever losses, either deliberate or accidental, occur.

•**Resistors,** for example, are intended to dissipate power and will normally be quite hot. If personnel will be exposed to such resistors, they should be properly guarded.

•One of the commonest causes of burns in factories, especially in

the summer, is **hot reflectors** on bench lamps when operators or other personnel lean their foreheads or other parts of their body against them. Commercially available are double shades which operate cool enough to prevent flesh burns. Lately we have been trying plastic grilles over the reflectors. They seem to protect quite satisfactorily.

•When **soldering irons** are used for exposed operations, they should be properly enclosed in guards to prevent accidental burns on persons unfamiliar with them.

•**Radio-frequency burns** are perhaps one of the most insidious types. Those who have suffered them claim that it takes up to six months for them to heal properly. This may be a slight exaggeration, but from personal experience it takes just about that long for the scar to clear up. I was working in a rather congested area once with an RF generator and I kept warning operators to keep out of that zone so that they would not suffer burns. Towards the end of that day being somewhat tired and growing a little careless, I stooped over to retrieve a tool and backed up into an RF conductor. It seems that you almost smell it before you feel it, and believe me, a combination burn and shock is most unpleasant. As a matter of fact under certain conditions, if the oscillator is operating at high voltage, a serious shock could be involved. In my particular case the burn imbedded part of the trousers into the flesh threatening to leave a design in the posterior for posterity. I don't know which was more serious, the burning flesh or the burning ego after warning everyone else.

Cuts and Scratches: Sometimes in an effort to hold down the cost of electrical equipment, burring operations normally specified on other types of equipment are omitted perhaps with the thought that burrs within a control cabinet are not important. If anything, extra attention should be paid to make sure that flesh wounds, scratches, or even deeper wounds are not caused when adjustments, repairs, or replacements are made within equipment.

•If cabinets lack sufficient room for the use of screwdrivers or other tools, the arms are crowded into such an awkward position that the flesh becomes wounded in manipulating them. Sufficient room should be allowed for working tools.

•Many electrical items contain so much iron that they are surprisingly heavy. It is important that they be properly supported by brackets or braces. There have been cases where improper supports have broken during operation and have injured users of equipment or maintenance personnel.

•Although this next feature is mechanical, it is very common to electrical equipment. Rotating or reciprocating parts should be designed or guarded to prevent injury to the body. In many cases the space left between a moving part and another part is just slightly less than the thickness of a human finger or other appendage of the body. If a moving part is backed up by sufficient power the crushing effect can be serious. Sometimes if the motion is slow enough, a guard will not be necessary provided that space is opened up so that no part of the body can be normally caught.

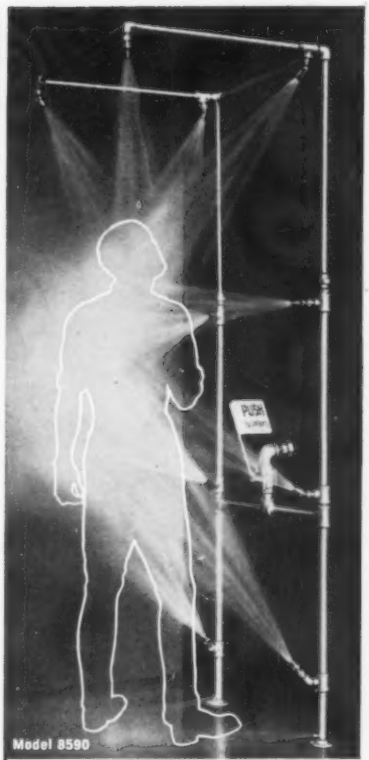
Problem of Guards

Guards are a nuisance. Everybody dislikes them from the people that have to design them to the people that have to remove and replace them. *However, there is no avoiding the fact that they are absolutely essential to prevent persons from catching parts of their body or clothing in moving equipment.* At least the annoyance can be reduced somewhat if the amount of guard to remove is kept to a minimum. For example, if lubrication is required, it can often be done safely through a small porthole.

•As machinery gets bigger, it becomes increasingly difficult for the person starting up the equipment to determine whether or not others are in a dangerous position. In such cases, have warning bells sound as the equipment is started. Signs should be posted around the machine warning that the alarm indicates starting the equipment.

•Doors and gates must be used on some equipment. Avoid having

(Continued on page 43)



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Edited by HENRY M. GROSMAN
Counselor at Law, Newark, N. J.

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Master Superior Court, New Jersey American Bar Ass'n, New Jersey Bar Ass'n, Chairman, Committee on Workmen's Compensation, New Jersey Bar Association National Federation Insurance Counsel Past Commander, American Legion, Post 10, ... Newark, N. J.

GOING TO AND FROM WORK—Returning Home to Launder Co-employees' Uniforms

Claimant who was injured while returning home to launder uniforms which were worn by herself and co-employees at her employer's hotel was not entitled to compensation because she was not in the course of employment but was engaged in an independent enterprise of her own. Claimant worked as a uniformed chamber maid at the employer's hotel. She bought her own uniforms and took care of her uniforms as well as those of some of her co-employees. The employer was aware of the fact that she frequently laundered the uniforms at her home. One evening while on her way home from work and while carrying two bags of uniforms to launder, she fell and sustained injuries. The board found that the accident did not arise out of and in the course of her employment. On appeal, the court affirmed, ruling that the claimant's laundering of uniforms was an independent enterprise. Affirmed.

Simmon's Case; Massachusetts Supreme Court. No. H-988, Sept. 28, 1960.

CEREBRAL HEMORRHAGE—Strain and Exertion Over a Two-Month Period

It was found that the cumulative effect of the claimant's work during a two-month period, involving stress and worry, including a foot injury, aggravated his pre-existing hypertension and precipitated a cerebral vascular injury. Claimant was employed as a field director by the defendant-employer for 25 years. His duties involved the erection of pipes, valves and gas and hydraulic machinery at plant sites of the employer's customers. He would be sent to distant places and, while on such assignments, his expenses were paid by the employer. Claimant was given the job of supervising the erection of two very large machines; the weather was adverse, local employment was poor, and much responsibility was involved because the machines were valued at over $900,000. At the end of two months, claimant bruised his foot when a 100-pound piece of steel fell on it. Within a day and a half the claimant suffered a cerebral hemorrhage while resting in his hotel room, resulting in a paralysis of one side of his body. In an appeal from an award in favor of the claimant, the employer contended that the accident (the stroke itself) did not take place within the course of the employment. The court ruled that inasmuch as the claimant was away from home on an assignment of an employer, the stroke did occur while in the course of employment and that, in any event, it made no difference at what time an injury manifested itself so long as the activity which gave rise to it occurred in the course of the employment. In addition the court ruled that the two month work episode was a sufficiently identifiable event to which the attack could be related and the medical testimony was sufficient to support the finding that the stroke was work-connected. Affirmed.

Joy vs. Florence Pipe Foundry Company; New Jersey Superior Court, Appellate Division. No. A-620-59, November 16th, 1960.

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(For details, use Key # H-5 on card on page 33)

SUICIDE—Leg Amputation and Subsequent Depression—Intentional Self Infliction of Injuries

Decedent suffered a compensable injury necessitating the amputation of his leg. Four and one-half months later, on the day he was to be fitted with an artificial limb, he hanged himself. The board granted the decedent's widow compensation and the lower court sustained the award, from which decision the employer appealed. Compensation cannot be had for intentionally self inflicted injuries. The burden is on the employer to prove that death is from suicide, but since it was admitted in this case that death was by suicide, it was claimant's burden to prove that the deceased killed himself "while possessed by an uncontrollable insane impulse or while in a delirium or frenzy as a direct result of the accident without rational knowledge of the physical consequences of his act." The court determined that whether the claimant satisfied her burden was a question of fact for the board. It was apparent that the deceased was out of mind after the amputation, but after his return home, he seemed normal. Nevertheless, there was medical testimony by a psychiatrist that the deceased was not responsible for his act and such evidence was sufficient to support the award even though testimony of a psychiatrist, who had treated the deceased prior to the date of the suicide, was to the contrary. Affirmed.

Blasczak vs. Crown Cork & Seal Company; Pennsylvania Superior Court, Philadelphia District. No. 321, Nov. 16, 1960.

RECREATIONAL ACTIVITY—Touch Football On Employer's Premises During Lunch Hour

Claimant who sustained a broken neck while playing touch football on the employer's premises during lunch hour was entitled to workmen's compensation because the accident arose out of and in the course of his employment. Employer operated a company cafeteria on the premises and it encouraged its employees to eat there. A recreational room adjoined the cafeteria where the employees often played indoor games. For about a year prior to the accident in question the employees had engaged in outside activities in an empty lot on the employer's premises. The evidence also indicated that the management knew of the outdoor activity and made no objection to it. The employer appealed from an award in favor of the claimant, contending that the claimant had signed out during his lunch hour like other employees, that he was free to leave the premises and that the game of football was purely personal activity. The court disagreed, ruling that the claimant had not abandoned his employment by playing football on the employer's premises during lunch hour. Affirmed.

Henry vs. Lit Brothers, Div. of City Stores, Inc.; Pennsylvania Superior Court. No. 213, November 16, 1960.

Safety Data Sheets

Revised editions of four chemical safety data sheets are now available from the Manufacturing Chemists' Association, Inc. These booklets are on Benzene, SD-2; Nitric Acid, SD-5; Paraformaldehyde, SD-6; and Anhydrous Ammonia, SD-8. They list not only the characteristics of these chemicals, but also the hazards, engineering control of hazards, employee safety procedures, fire fighting techniques necessary, recommended handling and storage practices, tank and equipment cleaning and repair procedures, waste disposal, medical measures necessary and first aid requirements. Available from the Association at 1825 Conn. Ave., N. W., Washington 9, D. C.

American Standards

Publication of a 1961 Catalog of American Standards which now number 1,973 has been announced by the American Standards Association. The booklet, available without charge, contains a listing of special publications in the standardization field, pamphlets and standards recommendations of the International Organization for Standardization and the International Electrotechnical Commission. It also has an index to titles of American Standards and international recommendations.

Areas Covered

The listing of American Standards is broken down into the various phases of application, and these include civil engineering and construction, mechanical engineering, electrical engineering, automotive, ferrous materials and metallurgy, nonferrous materials and metallurgy, rubber, chemical industry, textile industry, mining, materials handling, nuclear, wood industry, pulp and paper industry, photography and motion pictures, acoustics, vibration, mechanical shock and sound recording, office equipment and supplies, drawings, symbols and abbreviations, and miscellaneous and commercial standards.

Copies of the catalog may be obtained from the ASA, Dept PR 214, 10 East 40th Street, New York 16, N. Y.

Insect Wire Screening

A new mesh and wire diameter for aluminum insect wire screen particularly effective against pestiferous insects is included in a proposed revision of the types designated as standard, according to the Commodity Standards Division, Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce.

Wider Wire Tolerances

The new wire screen, plus the specifying of wider tolerances for the wire used in the making of the standard types of screen, is included in the proposed amendment of Commercial Standard CS138-55 for Insect Wire Screening, submitted to the industry for consideration and general acceptance. The amendment was requested by the Insect Wire Screening Bureau and has been approved by a committee consisting of representative manufacturers, distributors, and users.

Copies of the proposed amendment are available upon request from the Commodity Standards Division, U. S. Department of Commerce, Washington 25, D. C.

Electrical Lockout Safety Guide

Recommended safety precautions in electrical switch lockouts are described in the latest Safety Guide (SG-8) now available from the Manufacturing Chemists' Association, Inc. The Safety Guide, one of a series published periodically by the Association, recommends the use of lockout bars and caution tags, and urges that multiple locks be used when several crews are working on a single job. Locks should be of a separate series to prevent them from being opened by other craftsmen, the Safety Guide states.

As a further note of caution, the Safety Guide urges care be taken to be sure the switch controlling the unit to be worked on is locked out, particularly in areas where there is more than one switch.

The Association notes that equipment and controls used on circuits in excess of 600 volts do not lend themselves to the locking-out procedures outlined in the pamphlet. "In these instances," the Association states, "disconnects must be pulled and tagged."

The guide is available from the Association at 1825 Conn. Ave., N.W., Washington 9, D. C.

The Human Touch in Supervision

Do foremen and supervisors obtain the best results using the iron fist or a velvet glove? This is the theme of a new booklet by Cloyd Steinmetz, Sales Training Director for Reynolds Metals Company. The author approaches this age-old supervisory problem by explaining first what human relations is all about, and then how to motivate employees through an understanding of the basic principles of human relations.

The booklet is entitled "The Human Touch in Management." The author spells out H-U-M-A-N T-O-U-C-H—and makes each letter stand for an important basic principle. Thus:

H—hear him out
U—understand him
M—motivate him
A—acknowledge his efforts
N—news—keep him informed

Mr. Steinmetz has designed this booklet primarily for foremen and supervisors, but it may well be read by all who must deal with employees, from top management down to section leaders and department heads.

The booklet is priced at 25¢ per copy and may be obtained from Motivation, Inc. of Springdale, Conn.

Farm Safety Booklet

A booklet detailing good safety habits for farm employees has been published by the accident prevention department of the Association of Casualty and Surety Companies, it was announced by Thomas N. Boate, manager of the department. The 25-page publication, entitled "Your Guide to Safety As A Farm Employee," outlines the varied hazards of farm work and recommends proper safety precautions.

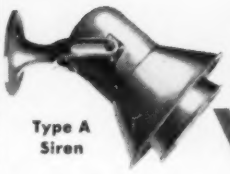
The illustrated pamphlet has been produced by the Association for its 135 capital stock casualty insurance company members and copies are available through independent agents and member companies.

The wallet sized booklet covers six broad areas of farm safety including: handling of machinery and equipment; transportation of employees; use of insecticides; use of edged or pointed tools; handling of domestic animals and operation of irrigation equipment.

Other Hazards

In a section devoted to general safety, the farm employee is advised to learn to identify and avoid poisonous plants such as poison ivy, oak and sumac and to be on the alert for poisonous snakes. The book also offers advice on what action to take during an electrical storm and how to lift heavy objects.

Dealing with off-the-job safety, the farm employee is warned: "At best, life is short. Accidental death and injury can make it even shorter . . . preventing accidents is IMPORTANT."



SOUND warning

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Signals, audible or visual, are quicker in action, are universally recognized and initiate *instant response.*

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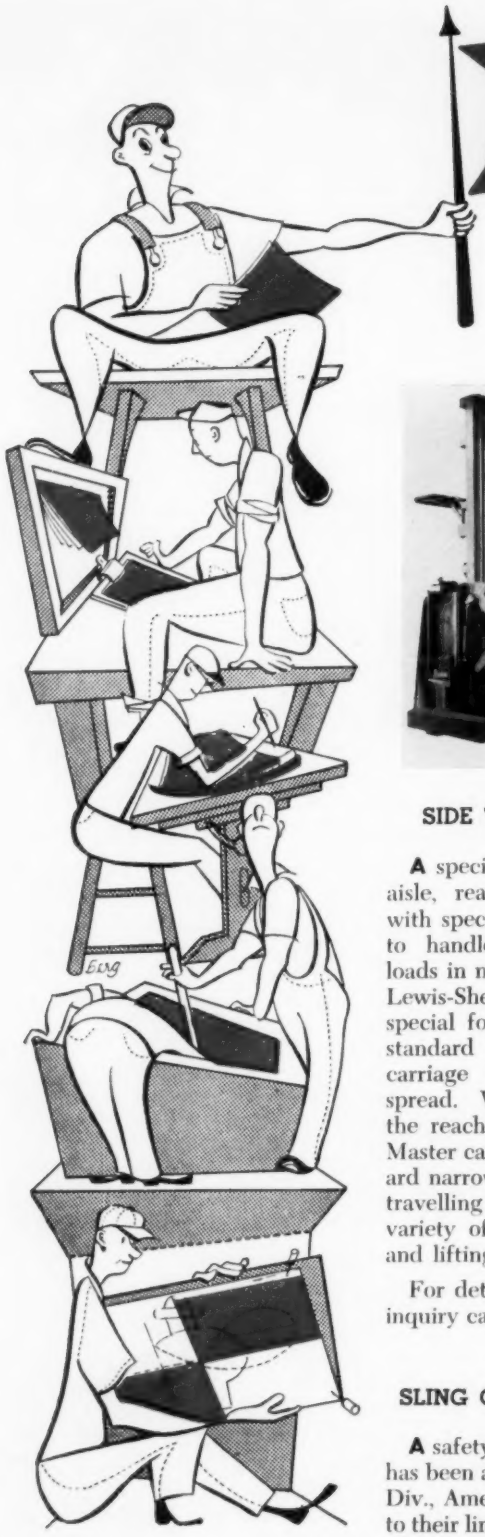
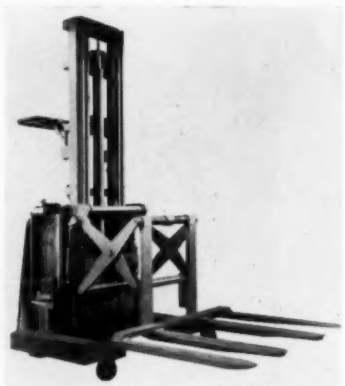
(For details, use Key # H-6 on card on page 33)

KEEPING UP WITH





SIDE TRAVELLING TRUCK

A special side travelling, narrow aisle, reach-style truck equipped with special slip-on forks designed to handle extra long, unwieldy loads in narrow aisles is offered by Lewis-Shepard Products Inc. The special fork attachment slips over standard forks and locks to the carriage to provide wider fork spread. Without the attachment, the reach-style electric MN Aisle-Master can also be used as a standard narrow aisle truck or as a side travelling unit when desired. A variety of capacities, fork lengths and lifting heights are available.

For details, use **Key # MH-1** on inquiry card on page 33.

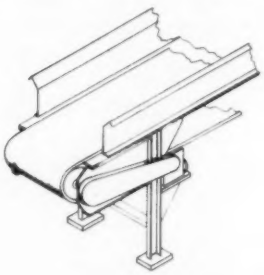
SLING CHAIN SAFETY HOOK

A safety hook and latch assembly has been added by American Chain Div., American Chain & Cable Co. to their line of Accoloy Kuplex sling chain assemblies. These sling chains consist of master link, chain portion, patented "Kuplers," and any desired type of hook—sling, grab or foundry—including the new safety hook with safety latch assembly. Present users can convert them to safety hooks by replacing the conventional load pin with a special safety latch assembly, available as a separate component.

For details, use **Key # MH-2** on inquiry card on page 33.

PORTABLE SECTIONALIZED CONVEYOR

To streamline the flow of packaged or unit-items over distances affected by varying conditions is the new Mentor-Veyor, a belt-type powered conveyor, made by Mentor Products, Inc. Adaptable for practically any layout, distance and terrain, it combines unitized design, simplicity, rugged construction and low cost. Layout is modified at will without disassembly or the usual knock-down and installation prob-



lems of permanent type systems. The unitized sections are in 5 ft. lengths, or multiples of 5 ft., butting end-to-end. They "corner" to practically any degree angle and operate over extremely rough and irregular surfaces in restricted areas. For sharp inclines, cleated belts provide positive load traction. Each section includes steel frame and sheet metal belt-channel on angle iron legs, canvas conveyor belt and electric motor. Available with or without power-drive unit.

For details, use **Key # MH-3** on inquiry card on page 33.

MATERIALS HANDLING DEVELOPMENTS

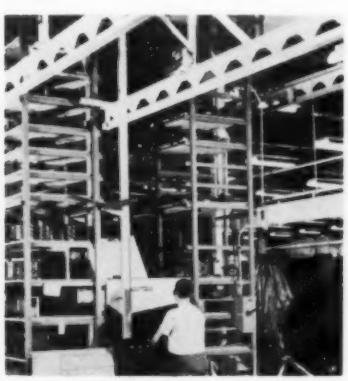
RUST RESISTANT CHAIN

Proof Coil Chain is available in a Hi-Sheen, rust resistant finish from The McKay Company. The finish will last indefinitely even during prolonged exposure to weather. For towing, binding and tying down, the chain is available in 3/16", 1/4", 5/16" and 3/8" sizes. Lengths vary from approximately 75 feet for the 3/8" size to 250 feet for the 3/16" size. It is made from low carbon steel, with an average tensile strength of 55,000 psi. Color coding every 5 feet provides quick measuring of the chain.

For details, use **Key # MH-4** on inquiry card on page 33.

AUTOMATED STORAGE

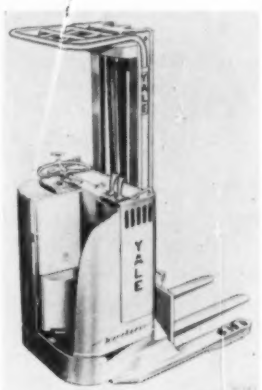
Dual command control with a memory circuit provides more efficient push-key storage and handling of heavy random loads in a new standardized model of the Retriever system introduced by The Triax Co. The operator can set the Retriever to deliver one load and to pick and return a different load in a single, uninterrupted cycle. Pallet loads of up to 1000 pounds are placed in storage openings by an electrically operated traveling carrier. Load lengths of 36" and widths of 24" can be accommodated in the openings of the standardized Model R-46. Users can select a fixed height for the openings and the over-all height for the rack structure, at any level from 12 feet to 24 feet. A Model R-46 unit that has a 75-foot aisle length and is 16 feet high would include 640 twelve-inch openings with complete load selectivity.



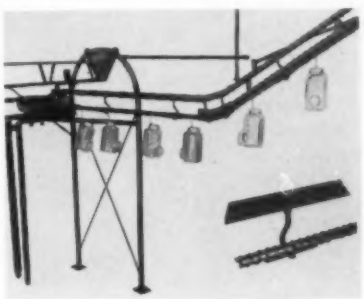
For details, use **Key # MH-5** on inquiry card on page 33.

HAZARDOUS LOCATION TRUCKS

Underwriters' Laboratories "E" and "EE" certification, permitting operation in certain fire and explosion hazard areas, has been granted the straddle and Extend-A-Load Warehouser, narrow aisle, electric trucks made by Yale Materials Handling Division, Yale & Towne. The UL listing covers 24-volt trucks in the two models in capacities of 2, 3 and 4 thousand lbs. for use in chemical, textile and similar industries. Type "E" modification permits usage in areas where fire hazards are not severe. The more complex Type "EE" modification is for areas where fire and explosion dangers are more acute, such as flammable liquids and gases storage, combustible dust accumulations, areas with combustible fibers or flyings such as cotton, rayon, jute and excelsior. Safety modifications for EE certification are: completely sealed control compartment, revised wiring to add 350 amp power line fuse, special battery compartment side plates, plywood insulation on underside of battery inspection cover, and totally enclosed drive motor.



For details, use **Key # MH-6** on inquiry card on page 33.



NEW TYPE OVERHEAD CONVEYOR

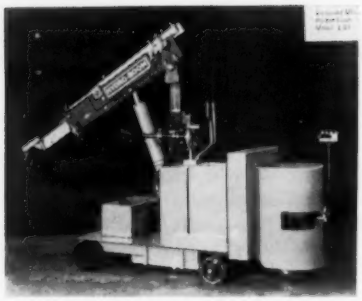
A revolutionary light weight overhead conveyor system that offers the advantages of the combined power and free systems has been developed by Philips & Davies, Inc. It employs the principle of a rotating screw to move loads along its route. Variations in speed and built-in station-stops may be provided by changes in the pitch of the helical feed coil or by the elimination of this external thread. By enlarging the stopping points, the system can also be used for temporary storage even while loads are in transit.

The Rotorail system employs simple hook-type hangers that may be placed on the system at any point. Standard components permit do-it-yourself installation, expansion or alteration. With the drive unit at one end, no return loop is needed. Nylon bearings eliminate the need for lubrication.

For details, use **Key # MH-7** on inquiry card on page 33.

MOBILE FLOOR CRANE SYSTEM

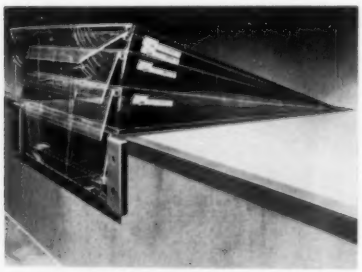
A counterbalanced mobile floor crane has been introduced by Vanguard Mfg. Co. The Hydro-Boom



Model 135 can lift 3000 pounds with the hook 48″ beyond the front edge of the platform. This Walkie self-propelled model is highly maneuverable and can turn in a distance equal to its own diagonal length.

The boom movement is hydraulically controlled in six directions of travel: up-down, in-out and right-left. Precision control makes unit suitable for changing dies, molds, grinding wheels, machine tool accessories, motors, etc., and in general maintenance applications. The hook can reach out and over obstacles. Available with hand pump hydraulic boom actuation for explosion hazard areas.

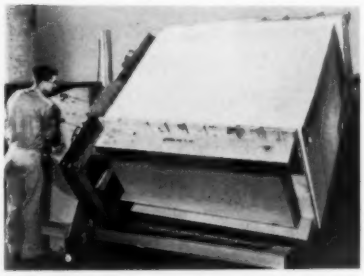
For details, use **Key # MH-8** on inquiry card on page 33.



AUTOMATIC ADJUSTABLE DOCKBOARD

The Kelley Company has announced an automatic lip-actuating feature increasing the flexibility, safety and ease of operation of its Adjust-A-Lip dockboard. In its normal dock level position, the Adjust-A-Lip is in its safety position protected behind steel-faced rubber-backed bumpers. Released from its level position by the dock attendant, the precision counterbalance raises it to the above-dock position. The multiple-exposure photo shows the dockboard rising until the lip is high enough to swing over the truck bed. Then the lip automatically extends to its working position. When the operator steps on the dockboard, it lowers to working position and automatically locks in firm contact with the truck bed. The lip can be extended or retracted at any time and retracts automatically when the truck pulls out.

For details, use **Key # MH-9** on inquiry card on page 33.

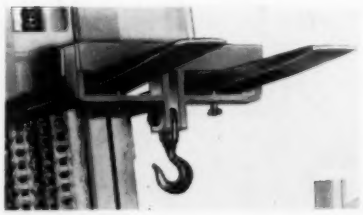


SKID TURNER

The new, completely automatic and portable Southworth Skid Turner simplifies the inverting of loaded skids. With the Model ST-5, one man can turn a 5,000 lb. skid load in 55 seconds. Any type of skid may be handled in sizes from 28″ x 38″ to 52″ x 76″, and with load heights ranging from 24″ up to 74″.

Originally developed for turning skid loads of paper, the skid turner can be used on any sheet stock; liquid products, canned and cartoned or in drums or barrels, when inverting will prevent sedimentation; for turning large objects or assemblies; and to transfer loads from shipping skid to plant skid.

For details, use **Key # MH-10** on inquiry card on page 33.



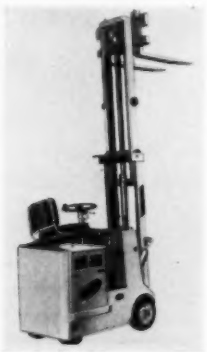
FORK SWIVEL HOIST HOOKS

The Grizzly swivel hoist hooks of Pucel Enterprises, Inc. are of all welded construction to fit standard fork trucks. Working capacities: for single fork—3000 pounds; for double fork—4200 pounds. Weighing from 17 to 50 pounds, they slide on easily and are tightened into place. The double fork hook shown has maximum openings with outside spread of 20¾ inches. Finished in Safety Orange. Special units are designed to meet particular requirements.

For details, use **Key # MH-11** on inquiry card on page 33.

VERSATILE TIERING TRUCK

A new 2000 pound capacity electric industrial truck, specifically designed for fast tiering under the most restricted warehousing conditions, is available from Elwell-Parker Electric Co. The F-26TA-2



features a short turning radius for maximum efficiency in narrow aisle operations; automotive type controls; natural driving position; inner uprights and elevator carriage roller mounted to reduce wear and power loss; worm drive; twin tilt cylinders; hydraulic wheel brakes; safety controls; caster trail axle; and a center sill frame. 3000-pound model also available.

For details, use **Key # MH-12** on inquiry card on page 33.

COMPACT ELECTRIC CAR

A new compact electric car for industrial service is available from

Namisco, Inc. The 182-pound, 30" wide car itself is used by plant executives, supervisors, inspectors, tool follow-up men, mail clerks, process engineers, machine repair men, maintenance men and plant guards. With a trailer having a 250-lb. capacity, it can also be used for factory, warehouse, stockroom, shipping department or office delivery service. The three-wheel electric car itself also has carrying space for loads or an additional passenger. The Delwick is driven by a special 12-volt electric motor that is operated by a foot switch and powered by a lead-acid battery with a trickle charger. For recharging, plug into a 110-volt circuit. Forward speed of the car is factory-set at 5 miles per hour. It has tubular steel frame and molded fiberglass body. Trailer is 26" wide, 50" long and 12" high.

For details, use **Key # MH-13** on inquiry card on page 33.

SAFE-GRIP SLING HOOK

The S. G. Taylor Chain Co., Inc., has introduced the Tayco Sling Hook No. A-75 for use with 1¼" and 1⅜" diameter alloy chain. Drop-forged from alloy steel and

heat-treated, its patented I-beam type design assures extra strength and provides a safe gripping area for the hooker. Engineers report that the hook will not bend, even at the point, providing that the working load limit is not exceeded. Side bending is greatly reduced. Other features include a larger eye to accommodate shackle pins and wire rope thimbles, and a wider, deeper throat.

For details, use **Key # MH-14** on inquiry card on page 33.

NARROW-AISLE PIVOTING TRUCK

Special materials handling techniques are made possible by the Towmotor Fork Lift Truck called the "Naro-Aisle-Stack" Model 590. This model can operate efficiently in aisles 4 to 6 feet narrower than those required by conventional fork lift trucks. The entire front-end assembly pivots 90 degrees to the right or left—for right-angle stacking or load pick-up. Hydraulically-operated outriggers stabilize the truck laterally during the pivoting. The Model 590, with a lifting speed of 70 feet-per-minute, also performs all regular fork lift truck duties in both warehouse and factory.

For details, use **Key # MH-15** on inquiry card on page 33.

CONTROLLED POURING CARRIER

A new Kontrol-Karrier, Model #185, has been developed by the Morse Manufacturing Co., Inc. to give controlled pouring of 55 gal.

drums at any height. Hooked to a monorail hoist, crane or chain block, with the Karrier saddle snapped to drum, the latter can be moved to any location or height desired. Chain loop performs tipping operation. Standard unit includes 6' chain drop or 12' overall length. Longer lengths available. Unit will handle 800 lbs. liquid or 500 lbs. dry loads with safety and ease. Special saddles available for fibre drums.

For details, use **Key # MH-16** on inquiry card on page 33.

PREFORMED WIRE ROPE SLINGS

Designated as Hi-Pli, a new series of ACCO Registered Preformed Cable-Laid Slings has been introduced by the Wire Rope Sling Department, American Chain & Cable Co., Inc. These wire rope slings, for any application where ease of handling is all-important, offer the flexibility and non-kinking advantages of hemp rope plus the strength of steel. Through preforming, the wires have the exact shape they assume in the finished rope, making the slings easier to handle, faster to install, longer lasting under bending conditions, safer to handle when worn, better strength under shock loads. These Hi-Pli slings are so flexible they can be tied in knots without harm. Coated with a bright galvanized Galacco finish, for corrosion resistance, the sling ends are double-locked for greater security. Proof-tested at twice the load carrying capacity, they are available in 12 different rope diameters, with breaking strengths from 3-tons to 113-tons for the 2-in. diameter sling.

For details, use **Key # MH-17** on inquiry card on page 33.

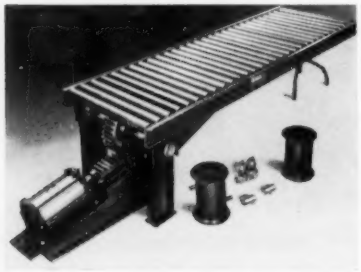
NEW SPREADER SLING

A new safeguard for men and materials has been developed by the U. S. Marine Corps for the loading and unloading of heavy equipment such as trucks. The sling design consists of four upper and lower wire rope legs, two galvanized spreader bars, and safety hooks and links. The upper wire rope legs connect the spreader bars to the supporting pear-shaped link at the top of the assembly; lower legs extend between spreader bars and terminal safety hoist hooks. The wire rope legs were fabricated to Marine Corps specifications by Jones and Laughlin Steel Company, Wire Rope Division. The safety hoist hooks are quick disconnect, positive lock type hooks made by the E. D. Bullard Co. Slings were developed in two sizes: Class I for a 5-ton load; Class II for loads up to 17 tons. Additional information available.

For details, use **Key # MH-18** on inquiry card on page 33.

CONVEYOR LIFT GATE

Sage Equipment Co., Inc. has developed a heavy duty, oil-air operated lift gate. These units are equipped with roller or wheel conveyor gates up to 10 feet long and 36″ wide. Complete control for raising or lowering is obtained through the use of the control valves. Remote control buttons can be used for operation from a distant point.



For details, use **Key # MH-19** on inquiry card on page 33.

NEW TYPE WIRE ROPE

A new type of all-purpose wire rope has been developed by the Macwhyte Wire Rope Co. This new wire rope, 7-Flex, is made of 7 strands instead of the conventional 6 or 8. This design is said to combine the best features of 6 strand and 8 strand wire rope. 7-Flex was developed to meet the needs of modern high-output machines for a wire rope having the best combination of wearing qualities (abrasion resistance) and flexibility (bending fatigue resistance).

For details, use **Key # MH-20** on inquiry card on page 33.

HEAVY DUST-PROOF TRUCK

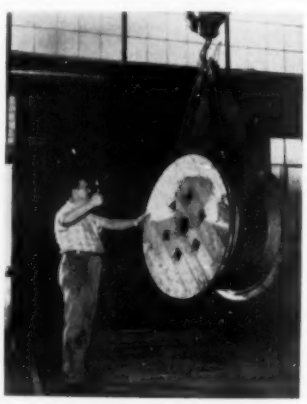
A heavy-duty dust protection modification for Yale gas powered industrial lift trucks has been designed by Yale Materials Handling Div., Yale & Towne, to reduce maintenance and lengthen engine life in applications where atmospheric contamination is very severe. In place of the dual air filter arrangement in standard dust protection modifications, the heavy duty system provides a triple filtering process: dry type precleaner, oil bath cleaner and a final dry type filter. Another feature is the sealing against contamination of the hydraulic system. The filler cap is a sealed fit and the breather line is run from the third stage of the air filter. The forced crankcase ventilating system, with sealed filler cap, also has a breather line off the air filter. A second line directs expelled air into the intake manifold. Features from the standard modification include sealed generator and voltage regulator, a heavy duty engine oil filter and an easily demountable floor dust deflector plate.

Typical applications for these dust protection modifications in the KG 51 line include: foundries, cement plants, abrasive manufacturing establishments, fertilizer and chemical plants and bagged goods warehouses.

For details, use **Key # MH-21** on inquiry card on page 33.

SYNTHETIC WEB-BELT SLINGS

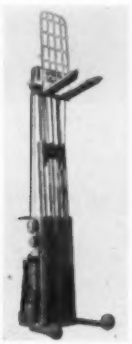
A new and complete line of synthetic Safety-Weave web belt slings of nylon and Dacron has been developed by the Wire Rope Division of Jones & Laughlin Steel Corp. With a comprehensive selection of fittings, they are designed for use in lifting finished products, machined surfaces and soft metals. 80 percent of the slings' reserve strength is in the inner plies, which are protected from abrasion by two tough outer plies. Light in weight, unaffected by mildew, rot, bacteria, or water.



A special neoprene coating to increase abrasion resistance by 50 percent and increase the coefficient of friction is available optionally. The nylon slings are furnished in nine widths ranging from 1 to 12 inches. Also, 6, 20 and 24-inch widths are

available on special order. The Dacron slings are produced in six widths, 1 to 6 inches; and six additional widths ranging from 8 to 24 inches are available on special order.

For details, use **Key # MH-22** on inquiry card on page 33.



NARROW-AISLE HIGH STACKER

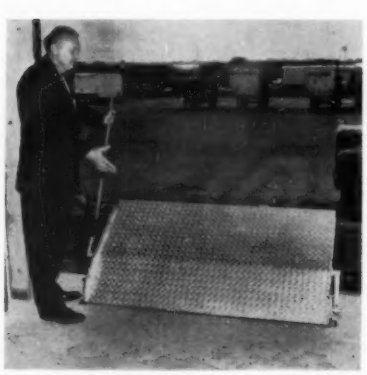
A 24-volt, narrow aisle Model MN AisleMaster truck, Hydrafork style, equipped with a Tri-Lift mast assembly and tilting forks enabling speedy operation in narrow aisles and extra high stacking of loads is offered by Lewis-Shepard Products Inc. The Tri-Lift mast design allows lifting to ceiling heights from narrow aisles for maximum storage accommodation. The tilting feature enables loads to be tipped back 4 degrees and cradled against the back rest for maximum safety during transporting and high stacking operations.

For details, use **Key # MH-23** on inquiry card on page 33.

LOW COST DOCK PLATE

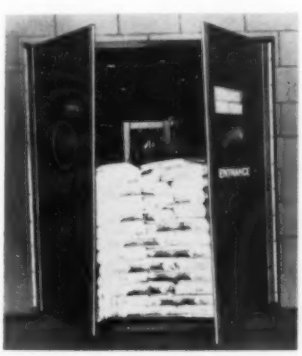
Low initial cost, minimum installation time and expense, single person operation, elimination of accidents, versatility and practically no maintenance cost are all features claimed for the new dock plate made by Converter Top, Inc. The lever-operated dock plate offers the mobility of any mechanical plate, without complex compressors, hydraulic lines, etc. It is easily installed.

For details, use **Key # MH-24** on inquiry card on page 33.



RUBBER-COVERED IMPACT DOOR

The Clark Durador, combining the assets of a rigid rubber door with a flexible curtain, absorbs rather than resists impact by fork trucks. Made by Clark Door Company, the door has a full length flexible rubber hinge for positive closure. It has a core of warp-resistant ⅜ inch Marine Plywood covered by ¼ inch live-rubber coating at the bottom half for added protection against gouging by trucks, and ⅛ inch at the top half. Leading edge has a protective layer of ⅜ inch rubber. The doors are available in stock and intermediate industrial doorway sizes for easy installation.



For details, use **Key # MH-25** on inquiry card on page 33.

GIANT FORK TRUCK

A general purpose fork truck, said to be the largest ever made, has been introduced by Clark

INSTANTLY INACTIVATES CHEMICALS IN THE EYES OR SKIN

NEUTRALIZE/Bullard

Where speed is so critical in the emergency treatment of acid or alkali splash in the eyes, *Neutralize* works many times faster than water dilution. Neutralize buffering action rapidly inactivates effects of chemical irritants. In 4, 8, 32 ounce and 1 gallon plastic bottles and 5 gallon plastic cubitainer with flow tube.

Write for data sheet.

E. D. BULLARD COMPANY
Sausalito, California

(For details, use Key # H-7 on card on page 33)

Equipment Company's Industrial Truck Division. It will lift 35 tons. The Ranger 700 is 12 feet high over the cab, 29 feet long (without forks), and 11 feet wide. With construction-type pneumatic tires and four wheel drive, the Ranger 700 is designed for especially heavy lifting work at steel yards, steel erection sites, lumber mills and similar outdoor operations. Because the massive loads might obstruct the operator's view, the truck has two sets of operating controls. Power steering, power-shift transmission and four-wheel power-assisted hydraulic brakes are standard equipment. The forks are moved together or apart hydraulically to fit different load widths or to pick up off-center loads. Unit is powered by a six cylinder diesel engine.

For details, use **Key # MH-26** on inquiry card on page 33.

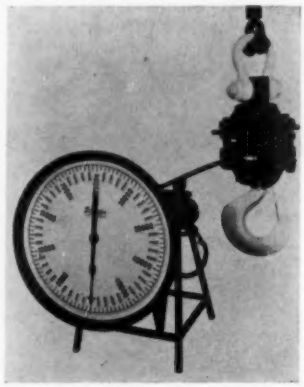
PALLET STACKING FRAME

The new curved-pin positive lock recently developed by Tier-Rack Corporation gives their portable pallet stacking frame more rigidity and stability. The two pins, at the top of the interchangeable steel tubular frames are now curved. With no nuts, screws or special attachments, Tier-Rack simply snaps on to standard wooden pallets. The sturdy frame supports and contains merchandise of all sizes and shapes, and permits safe high stacking.

For details, use **Key # MH-27** on inquiry card on page 33.

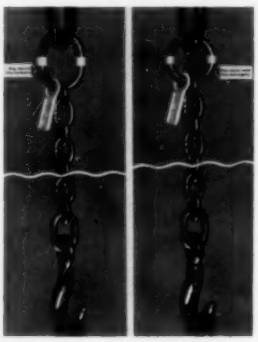
REMOTE INDICATING CRANE SCALES

Capacity ranges from 500 to 60,000 lbs. are now available in the exclusive Martin-Decker Remote Indicating Crane Scales as well as



in Standard Crane Scales. The new models feature minimum headroom loss, allowing greater stacking space in storage areas. The operator can read the dial at eye level while the load being weighed may be up to 100 feet away, even out of sight. The scales conform to the accuracy specifications of the Bureau of Standards. Safety features include ultimate strength of more than 5 times rated capacity and a dial crystal of shatter-resistant optic plastic. Available with calibration units in pounds or kilograms, they include full tare adjustment.

For details, use **Key # MH-28** on inquiry card on page 33.



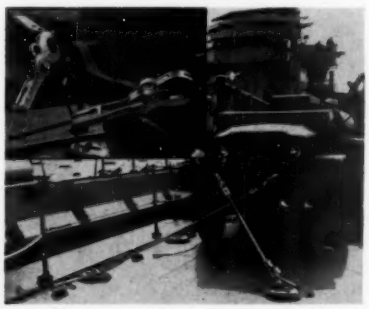
SLING CHAIN FEATURES OVERLOAD WARNING RING

A new concept in sling chains—a warning ring that provides visual evidence of overload—has been introduced by The Campbell Chain Co. The new Sentry Sling has a ring which elongates when the sling is overloaded. Though stronger than the chain itself, the ring gives immediate warning by changing shape, before permanent damage to the sling. Repairs are quickly made, with warning rings easily replaced at the factory. In most cases, only the ring need be replaced. Available in all types, the slings are made from Cam-Alloy steel chain.

For details, use **Key # MH-29** on inquiry card on page 33.

LOAD RELEASE SAFETY HOOK

A safety hook that can be released while loaded, permitting the operator to stand clear and eliminating the hazards of unhooking live loads, is announced by Merrill



Brothers. Positive lock prevents opening under any load conditions except when intentionally released by the pull ring. It combines quick use of conventional hook with safety of a shackle, without pin problems. Release-A-Matic Hook will fit practically any type of fitting, is light in weight, has a wide opening with small girth. It has been approved by the U. S. Navy for shipboard and amphibious use.

For details, use **Key # MH-30** on inquiry card on page 33.

TRUCK & DRAIN RACK UNIT

A combination truck and drain rack, for users of solvents, cutting oils and detergents, is being manufactured by Palmer-Shile Co. It can be easily moved through crowded, narrow aisles. Loading is accomplished by tilting truck against drum and sliding steel fingers down

to engage top rim of drum; then truck is rocked back to wheeling position, and loading is automatic. Slight downward push on truck handles raises wheels and lays rack on floor, providing convenient drain of drum. Equipped with detachable handles that may be removed to conserve floor space.

For details, use **Key # MH-31** on inquiry card on page 33.

INSULATING LINK FOR HOIST

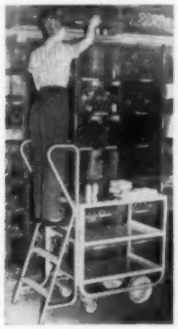
A low-voltage insulated link designed to insulate a hoisting mechanism from the weldment is offered by E. D. Bullard Co. When a weldment is not properly grounded, the

current flows back through the chain into the hoist. Frequently electric hoists are burned out, and the temper of expensive alloy chains has been lost. The links are manufactured in sizes ½ to 5-ton, 1 KV. Steel inserts separated with laminated insulating core are wound with glass fiber roving and bonded together with epoxy resin. The safety links are easily connected by means of a bail or safety hoist hook. They do not impair hoist lifting capacities—each link has a 4 to 1 safety factor and a 2 to 1 dielectric safety factor.

For details, use **Key # MH-32** on inquiry card on page 33.

HIGH ACCESS HAND TRUCK

A safety truck, for quick, easy access to high bins and shelves, is being manufactured by Nutting Truck and Caster Co. Operator's weight depresses the spring loaded ladder to the floor, providing positive braking action on its rubber tipped feet. The truck cannot move until operator steps off ladder. Fea-



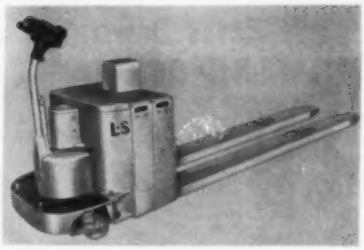
tures include safety treaded steps; top cross bar and extended handles; heavy duty steel angle frame and smooth shelves welded into a solid unit. Two and three shelf models available with or without galvanized trays. Demountable rubber tired wheels.

For details, use **Key # MH-33** on inquiry card on page 33.

LIFTING CLAMP ADAPTER WIDENS RANGE OF GRIPS

A device made available by Merrill Brothers for use with their Special Opening "G" Clamp increases this clamp's range of grips. A 1-ton with ¾" x 1⅜" grip can be converted into a clamp having 0–¾" grip by simply slipping the adapter into position. This provides one compact lightweight clamp to handle 0 x 1⅜" materials. A 3-ton 1¾" x 3⅛" can be converted to 1¼" x 3⅛".

For details, use **Key # MH-34** on inquiry card on page 33.



DUAL-PALLET RIDER TRUCK

A rider-type walkie truck designed for handling two, 2,000# capacity pallets, each 48" x 40", at one time has been introduced by Lewis-Shepard Products Inc. Available with speeds up to 6.5 miles per hour, the newly designed order picking electric walkie doubles the operator's order picking efficiency in distribution warehouses.

For details, use **Key # MH-35** on inquiry card on page 33.

SAFETY LIFT HOOKS WITH SWIVEL FEATURE

Unlimited load maneuverability with safety is offered by the new, built-in swivel feature of the latest model J. & J. Safety Lift Hooks from Mentor Products, Inc. Used with overhead cranes, swivel feature permits dies to be maneuvered 360° around the swivel while the attaching bolt remains securely tightened. Bolt is tightened snugly against a swivel bushing in hook body. Hook revolves around bushing; preventing excessive wear and stress on bolt body and threads. Forged hook, bushing and bolt cannot be disassembled. Proof-tested at twice rated capacity. Available in 3, 6, 9, and 15 ton models.

For details, use **Key # MH-36** on inquiry card on page 33.

Injury Rates Down In Fourth Quarter

Following the usual seasonal pattern, the all-manufacturing injury-frequency rate of 10.4 for the fourth quarter of 1960 was 13 percent below the third-quarter average, according to preliminary data compiled by the U. S. Department of Labor's Bureau of Labor Statistics.

In most previous years for which data are available, the all-manufacturing injury rate has shown little change between September and October, but has always recorded substantial decreases in November and December. In 1960, the October rate was 2 percent below September; the November rate decreased 8 percent and December 6 percent. The December rate of 9.7 disabling injuries per million man-hours worked was the lowest for any month on record.

6% Below 1959

The average injury-frequency rate of 10.4 for the fourth quarter of 1960 was 6 percent below the corresponding period of 1959 and equalled the previous all-time quarterly low, established in the fourth quarter of 1957.

The average injury rate for 1960 will be an indicated 5 to 6 percent below 1959, approaching the record low of 1958. The preliminary average of 11.3 injuries per million man-hours was less than 4 percent above the 1958 figure of 10.9 and was slightly below the 1957 average. Subsequent reports, still being tabulated, may alter the 1960 figure slightly.

Almost half (63) of the 134 individual industry classifications for which comparable data were available showed decreases of 1 full frequency-rate point or more between the third and fourth quarters of 1960; 56 showed little change, and only 15 recorded significant increases. The plastics industry showed the most spectacular increase, from 4.3 in the third to 10.6 in the fourth quarter, due almost entirely to a disaster in October, which took the lives of 15 workers and injured 110 others in one plant.

Outstanding decreases between the third and fourth quarters of 1960 were recorded for the following industries: leather tanning and finishing, from 34.1 to 19.5; sawmills and planing mills, 45.2 to 32.9; boat building and repairing, 36.1 to 26.2; partitions and fixtures, 22.3 to 13.5; wooden containers, 33.6 to 26.4; millwork and structural wood products, 25.8 to 19.2.

Improved Records

On the basis of the record for the entire year, decreases of one full point or more were recorded for 43 industries, while increases were shown for only 22. The annual average for the majority of the industries (73)—remained virtually unchanged.

All industries in the stone, clay, and glass group, showed decreases of 1 full point or more. The average for the group decreased from 18.4 in 1959 to 15.5 in 1960. The average for the primary metals group decreased from 11.6 to 10.4; and leather and leather products, from 12.9 to 11.8. On the other hand, the average for the furniture and fixtures group of industries increased from 16.4 to 18.2 and that for printing, publishing, and allied industries, from 10.1 to 11.2.

Individual industries with outstandingly low injury-frequency rates for 1960 were: synthetic rubber—1.4; aircraft—2.1; scientific instruments—2.2; electric lamps (bulbs)—2.4; electrical equipment for vehicles—2.5; radio tubes—2.5; miscellaneous communication equipment—2.5; synthetic fibers—2.7.

Crash Injury Research

A grant of $175,000 to the Automotive Crash Injury Research program of Cornell University has been announced by the Automobile Manufacturers Association.

The Cornell award is in addition to $1,706,000 already contributed by AMA in the 1960-61 fiscal year to promote greater traffic safety and more efficient use of highways.

This is the third successive year in which AMA has granted funds to the Cornell program. In three previous years, grants were made by individual vehicle producers. Auto industry contributions to the program now total $1,100,000. Additional support is provided by U. S. government agencies.

The eight-year-old program involves the statistical analysis of traffic accident data to determine the nature of passenger injuries and their relationship to vehicle design and accident configuration. Reports on nearly 40,000 accidents in 19 states and five cities have been collected since 1953. Augmented by photographs, the reports provide detailed descriptions of both traffic injuries and vehicle damage.

Findings of the Cornell researchers are reported to auto makers, government departments and other groups active in traffic safety.

Crippling Accidents Film

The Trap, a new safety film on crippling accidents in industry, is now in production by Harvest Films, producers of the award-winning "It's Up To You!" Made with the cooperation of the National Society for Crippled Children and Adults, *The Trap* will be a hard-hitting, graphic portrayal of crippling accidents caused by on-the-job carelessness. It is a 16 mm. sound film, in black and white, for industrial employees. It will be available on a sale and rental basis from the producers, Harvest Films, Inc., 90 Riverside Drive, New York 24, N. Y.

New Hazards

(from page 8)

a patent was issued for a safety pin.

•Watts perfected the steam engine in the 18th century—but it was 100 years later that the safety valve was developed.

"Contrasted with the rapid development of safety controls in the use of atomic energy . . . and we see how much better we are doing today," Schlueter commented.

"But," he added, "there remains a gap that can be reduced still more by meeting new hazards with new safeguards, new protective equipment, new methods, new approaches . . . new ideas."

THE FIRE FRONT

Firefighting Courses in Radiation Hazards

Two new instruction programs for helping firemen learn how to cope with radiation hazards in fighting fires have been prepared for use of the states by the U. S. Department of Health, Education and Welfare and the U. S. Atomic Energy Commission. The AEC Office of Industrial Relations and the Division of Vocational Education, U. S. Office of Education, have cooperated in the joint effort.

The importance of training firemen and other public safety personnel to deal with fires and other emergencies involving radioactive materials has long been recognized by the Atomic Energy Commission. For several years a small AEC field staff has provided a limited program of direct training to members of fire departments upon request.

With increasing use and transportation of radioactive materials, however, a new approach is needed to broaden the availability of such training. Since state trade and industrial education programs have provided firemen training for many years, it is logical that such programs should now provide for additional training needs in the new area of responsibility created by radioactive materials.

As a forerunner to additional training materials, a 4-hour orientation unit entitled "Peacetime Radiation Hazards in the Fire Service" has been prepared. It consists of an instructor's guide, a student manual, and 12 illustrative charts for use by the instructor. The unit is intended for presentation to large numbers of professional and volunteer firemen as part of their basic training, and to prepare them for more specialized instruction later.

As stated in the preface to the 42-page illustrated instructor's guide, "The general aim of the unit is to familiarize firemen with the following:

1. That radiation is simply another hazard of human existence, neither to be unduly feared nor to be ignored.

2. That a difference exists between internal and external radiation hazards.

3. That adequate pre-emergency planning is necessary.

4. That radioactive materials in ordinary use do not make other things radioactive.

5. That in general the most serious effect of a radiation incident will probably come about from contamination of the surrounding area, and the problem will be reduced to the extent that the contamination spread is limited during firefighting operations.

6. That an explosion which might occur in the use of radioactive material will be of a chemical nature, and will not result in an atomic bomb type of explosion.

7. That safety measures are inherent in the design and in the transportation of atomic weapons which will preclude a nuclear explosion in the event of an accident. However, there might be a serious detonation of the ordinary explosive materials in the weapon resulting in possible radioactive contamination."

The 4-hour orientation program will be followed by a 15-hour basic course to be published at an early date. It will include an instructor's guide, student's information manual, student work assignments, and 22 charts. This program will enable qualified firemen and selected instructors to train others in their own local communities to deal with radiation emergencies.

The instruction programs contain no classified information, and no security clearance is required to participate.

Fire organizations wanting information about the radiation training programs should get in touch with their state supervisors of trade and industrial education or other appropriate state agencies responsible for firemanship training.

Material covering the 4-hour orientation unit "Peacetime Radiation Hazards in the Fire Service" is available through the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. The student manual is priced at 30 cents, and the instructor's manual at 35 cents. Extra copies of the illustrative charts will be obtainable in limited quantities from the Trade and Industrial Branch, Division of Vocational Education, U. S. Office of Education, Washington, D. C.

May Fire Losses Rise

Estimated fire losses in the United States during May totaled $93,103,000, the National Board of Fire Underwriters has reported. This figure was 2.5 percent below the $95,486,000 for April of this year, and 7.1 percent above the $86,940,000 for May, 1960, according to Lewis A. Vincent, NBFU's general manager. In the first five months of this year, the dollar value of property damaged or destroyed by fire was $531,669,000, an increase of 8.3 percent over the $491,142,000 for the like period of 1960. These estimated losses include an allowance for uninsured and unreported losses.

Community Fire Programs Increasing

More and more towns and cities throughout the nation are conducting community fire safety programs, according to the National Board of Fire Underwriters, in a report presented at the 95th annual meeting of the National Board in New York by K. B. Hatch, chairman of the National Board's committee on public relations and president of the Reliance Insurance Company.

"The National Board has long been the leader in the vital battle against fire and at the same time protection of life and property from explosion, windstorm and other causes continue to receive major emphasis," Mr. Hatch said.

"In the field of fire prevention education and in the dissemination of fire prevention information, wholehearted cooperation from the public, government, business and industry lends strength to the never ceasing struggle to preserve life and property from the ever present specter of fire.

Year-Round Job

"While public attention to the need for fire prevention is concentrated on the three major campaigns conducted each year—Fire Prevention Week, Holiday Safety, and Clean-Up Week—our work is not confined to these campaigns.

"Fire is a year-round threat and the National Board's fire prevention activities are reflected in the week-by-week and day-by-day requests for fire prevention literature, for advice on local fire prevention programs and for motion pictures and speakers on the subject.

"We note a continuing trend toward community fire safety programs," Mr. Hatch said.

Citywide and countrywide fire safety committees are now coordinating fire prevention efforts, Mr. Hatch noted. Newspapers and magazines have added their impact, and the Insurance Information Institute has provided material for the three major fire safety campaigns. Radio and television spot announcements go to every station throughout the country for broadcasting during the three campaigns.

New Fire Film

The National Board during the year added a new film, "The Science of Fire," to its film library. The film, especially adaptable for secondary schools and colleges, presents the principles of combustion and how they may be applied to fire prevention. A second film with the working title, "You Can't Trust to Luck," has been prepared for showing to the general public. The film deals with fire prevention in the home.

Are Fire Experts Causing Fires?

Is the fire protection expert to blame when a crippling fire hits an industrial plant?

The answer may be **"Yes!"**

This opinion was voiced by a man who himself is a fire protection expert, George F. Wahl, general manager of Factory Mutual Engineering Division at Norwood, Mass., speaking at the National Fire Protection Association's 65th annual conference.

Wahl said that the responsibility for such industrial catastrophes is usually assessed against management, with lesser criticism directed at the watchman, or the fire fighter, or the loss prevention engineer.

Actually it may be the failure of all fire protection experts collectively, he said. "It may be really you and I who have failed—we have not presented the conservation picture clearly or effectively."

Success in controlling fire disasters is a team effort, declared Wahl, and we must not accept these losses as inevitable.

Wahl described a practical conservation program which involves five key points:

1. If there are combustibles present—and don't be misled by statements that "there is nothing to burn"—a fire control program is needed.

2. Ignition sources are plentiful, contrary to "there is nothing to start a fire" statements. Remember that ignition sources are portable—welders' torches and smokers' matches, for example. Control of this hazard starts with the quality of installation and maintenance of building and equipment, and education of employees.

3. Quick detection of fire is important, but only effective when there is quick response of forces sufficient to control the situation. Today we are relying more and more on automatic detection equipment.

4. Combustibles plus ignition promptly detected will not become a catastrophe if proper control has been planned beforehand. Control ranges from extinguishers and employees to fire hydrants and fire department—all reliable when combined in a good program. The best form of control is still the automatic sprinkler system.

5. No conservation program is good without people, from management to workman, who can lead, keep step with changes, make decisions, and above all who are trained in a sound conservation philosophy.

One reward from a sound conservation program, Wahl told the NFPA meeting, is the protection against an industrial fire catastrophe, with its far-reaching consequences for company, executives, employees and community.

Just as important, he concluded, is the feeling of satisfaction which comes to those who operate safe plants.

Fire Engineers Elect

Warren J. Baker, manager, Technical Department, Insurance Company of North America, Philadelphia, was elected president of the Society of Fire Protection Engineers. He succeeds James J. Duggan, director, Safety & Fire Protection, Union Carbide Chemicals Co., South Charleston, W. Va.

The professional society, a section of the National Fire Protection Association, was meeting in Detroit in conjunction with NFPA's 65th annual conference.

First vice-president of the Society of Fire Protection Engineers is John N. Pryce, director, Fire Protection Engineering Dept., Canadian Underwriters' Association, Montreal, P. Q. Second vice-president is J. E. Johnson, president, Viking Fire Protection Company, Kansas City, Kansas. Re-elected as secretary-treasurer is Robert S. Moulton, recently retired technical secretary of the National Fire Protection Association, Boston.

In addition to the officers, members of the executive committee include:

Loren S. Bush, chief engineer, Pacific Fire Rating Bureau, San Francisco, Calif., who is also president of the National Fire Protection Association, and Edwin N. Searl, assistant manager, Western Actuarial Bureau, Chicago, Ill.

As a rule of thumb . . .
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YOUR SAFETY NEWS is a safety punching brochure that has become the official monthly house organ on safety for many prominent companies. This unique bulletin, with its diversified safety themes has been used successfully to create millions of safety-thinking employees all over the United States. It delivers down-to-earth safety hints with a **FRIENDLY NUDGE!**

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REDUCING ACCIDENT RATES by producing safe-thinking employees.

LOWERING INSURANCE COSTS by lowering your accident frequency.

PREVENTING COSTLY WORK STOPPAGE by giving helpful safety tips designed to build in an awareness of hidden hazards.

IMPROVING EMPLOYEE RELATIONS by your continuing expression of concern for their welfare.

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YOUR SAFETY NEWS
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LOOK BEFORE YOU LEAP!
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Generous use of color sparks the message, and adds impact to the contents of YOUR SAFETY NEWS. Each issue is as alive as any news-stand favorite.

★ EMPHASIZES SELF INTEREST

Your employee's self interest in his own safety is always emphasized. Constant safety consciousness is promoted by covering household hazards, transit to and from the job and on the job caution against accidents.

★ CLEVERLY ILLUSTRATES THE POINT

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PLANT MAINTENANCE

Dry-Mop Vacuum System 297
Hoffman Industries, Inc. Illustrated brochure describes a dry-mop vacuum cleaning system utilizing a series of air-exhaust slots to remove dirt, dust, lint and germs from mops and dusters. Piping carries the dust to a central dust collector.

Equipment Maintenance Data Sheets 298
Puritan Chemical Co. These two data sheets outline recommendations on the proper care, cleaning and storage of floor machines, vacuums, mopping outfits, and wringers, sprayers, brooms and squeegees. One data sheet covers mechanical equipment and the other hand equipment.

Gratings & Treads 299
Blaw-Knox Grating Dept. Unusually well-illustrated 20-page brochure describes a varied line of floor gratings and treads. Includes safe load tables, fastening data, application pictures, baked enamel types for chemical resistance, interlocked aluminum types.

Floor Underlayments & Resurfacers 300
Allied Compositions Co., Inc. This 32-page guide of floor underlayments and resurfacing materials gives recommendations on the selection and application of materials for many frequent flooring problems. Includes a quick-reference chart, concrete additives, sealers, coatings, terrazzo materials as well as underlayments and resurfacers.

Resurfacing Material 301
Masury-Young Co. This 6-page illustrated folder shows a do-it-yourself floor resurfacer that is exceptionally strong and abrasion-resistant and designed for use on concrete, wood and metal floors.

Work Lighting 302
Fostoria Corp. Brochure describes and illustrates industrial lighting devices for critical work areas for seeing comfort, greater safety and accuracy, better morale, higher production.

Grounding Facts 303
Arrow Hart Co. Informative 8-page bulletin covers equipment for the grounding of portable electric tools and other applications. Includes a resume of the revised grounding code requirements.

PERSONAL PROTECTION

Safety Shoes 304
Red Wing Shoe Co. Catalog of a new line of safety shoes featuring 16 styles for on and off the job uses. Includes 6", 8" boots, chukkas, pull-ons and dress oxfords, all with steel safety toes.

Safety Belts 305
Mine Safety Appliances Co. Wide variety of safety belts and harnesses are described and illustrated in this 8-page bulletin, which gives data on quality control, types of leather and webbing, tensile strengths, metal hardware, and design adaptations. Highlighted are body and suspension type belts, linemen's belts and straps, lanyards, shock absorbers, etc.

Gas Mask for Rocket Propellants 306
Willson Products Div., Ray-O-Vac Co. Bulletin describes a gas mask that meets the requirements of the Army Chemical Research & Development Labs. for organic, acid and ammonia type liquid rocket fuels such as fuming nitric acid, UDMH, hydrazine, hydrogen peroxide, kerosene, aniline and alcohol.

Welder's Adjustable Headgear . 307
Welsh Mfg. Co. Bulletin illustrates and describes a new type of headgear for welder's helmets, featuring complete adjustability, interchangeable front frames for efficiency and comfort. Detail drawing shows construction.

Safety Spectacles 308
Wilkie Optical Co. Well illustrated folder presents a full line of safety glasses in a wide variety of styles, including plastic or wire frames, with and without side shields of plastic or metal mesh.

FIRE PROTECTION

All-Purpose Extinguishers 309
Fyr-Fyter Co. Bulletin gives data on a new fire extinguisher of the dry chemical type suitable for all three classes of fire: flammable liquid, electrical, and ordinary combustibles. Includes information on UL and FM listings and UL ratings for 20 and 30 lb. sizes.

Truck Loading Rack Protection . 310
National Foam System, Inc. New booklet describes fire protection methods for tank truck loading racks. Covers control of fire

(Continued on the next page)

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by water spray and foam and methods of proportioning foam liquid, for fixed pipe systems and portable nozzles. Illustrated.

MISCELLANEOUS

Parking Lot Layout Templates .. 311
Maintenance, Inc. New set of six parking lot layout templates are suitable for any type of parking arrangement, especially those for industrial plants and public buildings. Includes two templates each for 45, 60 and 90 degree angles.

Safety In Power Failures 312
Electric Cord Co. This 12-page booklet shows what happens in power "blackouts" and how the risks inherent in these emergencies can be avoided through the use of battery-operated emergency lighting. Typical installation diagrams and approximate costs are included.

Truck & Bus Mufflers 313
Alexander-Tagg Industries, Inc. Bulletin describes heavy-duty replacement mufflers for peak power, noise reduction, minimum back pressure, and longer muffler life. The welded steel mufflers are said to meet all recognized anti-noise standards.

Marking Devices 314
M. E. Cunningham Co. More than 200 marking tools, fixtures and automated machines are detailed in this 48-page catalog, including non-mushrooming types of steel stamps and several models of holders.

INDUSTRIAL HYGIENE

Mine Drill Dust Collector 315
Mine Safety Appliances Co. Bulletin describes a collector that draws dust through the hollow drill steel during placement of holes for roof bolts in mines, approved by Bureau of Mines and adaptable to any approved drill.

Air Pollution Field Tester 316
Central Scientific Co. The purpose, construction, operation and maintenance of air pollution field test apparatus is described in this 18-page brochure. Gives step-by-step procedures for measuring 18 major gaseous and particulate pollutants.

What's Your Problem?

- **Has an accident or fire interrupted production?**
- **Want to know how to prevent it?**
- **Do you need background information on equipment for industrial safety, hygiene, or maintenance?**

As a service to its readers, this publication will arrange to supply manufacturers' literature on the following subjects. Just insert the key number on the Readers Inquiry Card on the preceding page and be sure to fill in your name and address. If you need information on a specific type of product, simply write it in on the Inquiry Card.

Key Number	Subject
	PERSONAL PROTECTION
101	Safety Goggles
102	Face Shields
103	Lens Cleaning & Anti-Fogging Equipment
104	Sweat Band
105	Hard Hats
106	Respirators & Masks
107	Protective Clothing
109	Safety Belts
110	Safety Gloves
111	Electrical Gloves Tester
114	Welding Helmets
115	Fire Fighting Suits
117	Safety Shoes
	FIRST AID AND HYGIENE
120	Protective Skin Creams
122	Sanitary Drinking Facilities
124	Salt Tablets
125	Resuscitators
126	Antiseptic Medication
127	Burn Medication
127A	Poison Ivy Immunizer
127B	Poison Ivy Medication
128	First Aid Kits & Supplies
129	Stretchers & Litters
129A	Stretcher Cases
130	Throat Medication
131	Eye Wash Fountains
131A	Emergency Showers
132	Portable Ventilators
133	Dust Collectors
135	Hearing Protectors
137	Noise Mufflers (machines)
	FIRE PROTECTION
141	Safety Cans
142	Fire Alarms
148	Watchmen's Control System
149	Fire Blankets
	LIGHTING AND WARNING DEVICES
150	Alarms & Warning Lights
153	Fluorescent Lamp Guards
154	Emergency Lights
155	Truck Back-Up Alarms
	MAINTENANCE
161	Anti-Slip Waxes & Finishes
162	Floor Cleaning Compounds
163	Floor Cleaning Machines
164	Floor Resurfacing Compounds
165	Oil Absorbents
168	Ultrasonic Flaw-Detector
	LADDERS & HANDLING
170	Ladders
171	Ladder Safety Devices
172	Scaffolds
173	Work Platforms
174	Emergency Ladder Rungs
175	Safety Hooks
176	Folding Truck Steps
177	Carboy Pumps
	GUARDS
178	Machine Guards
179	Power Press Feeders
180	Safety Tools
181	Vacuum Sheet Lifters
182	Valve Operators
184	Safety Lock-Outs
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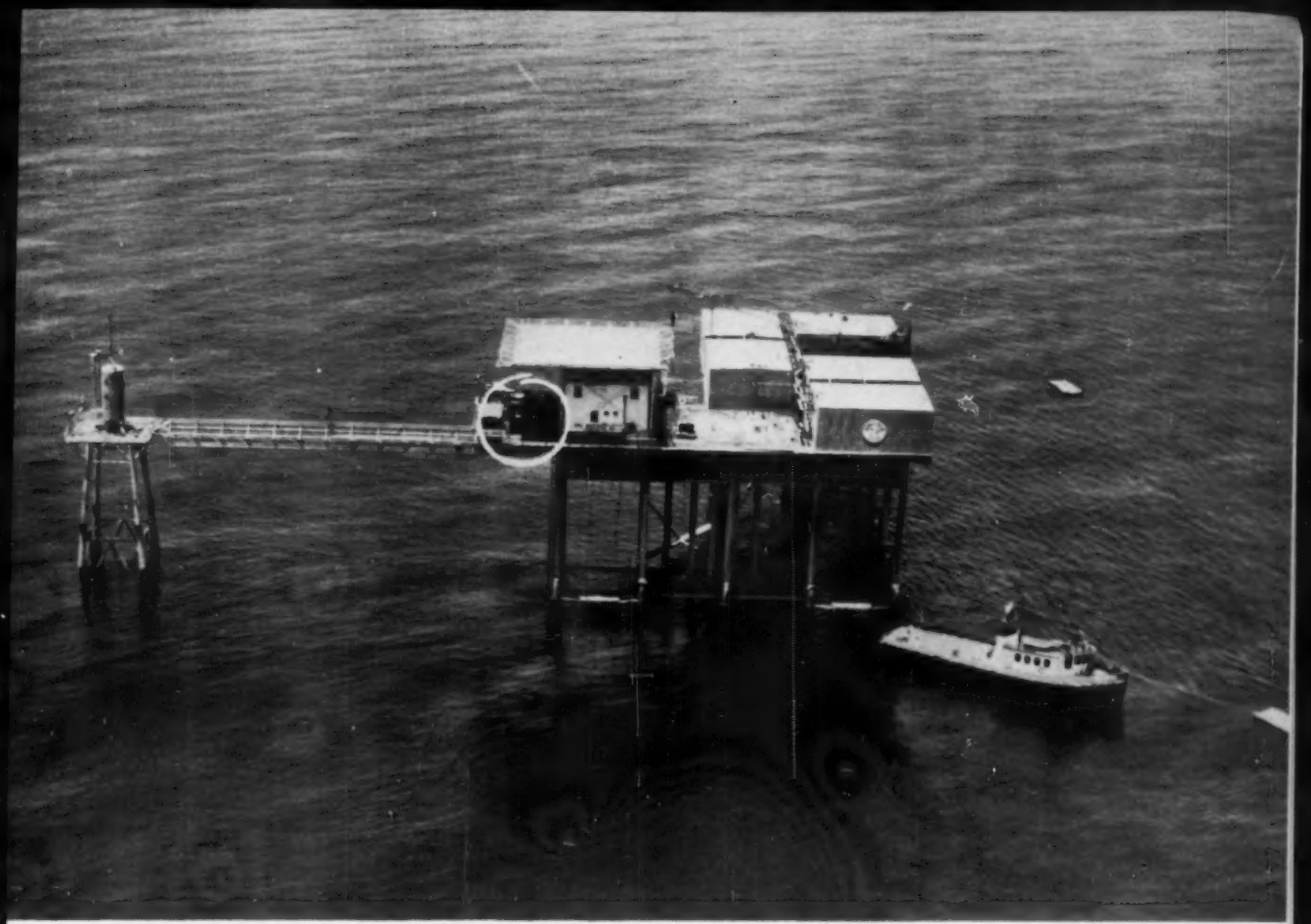


Typical producing platform in Gulf of Mexico. Circle indicates two generators protected by dry chemical piped systems.

NOT ENOUGH WATER FOR FIRE?

Off-shore oil rigs pump water from the sea around them for fire protection, but dry chemical guards the generator that runs the fire pumps.

Sinclair Oil & Gas Company has added a measure of fire protection for its off-shore producing platforms in the Gulf of Mexico that has created considerable interest in the petroleum industry.

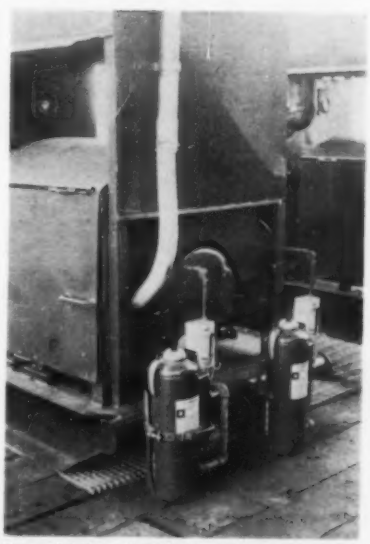
The protection consists of two small automatic dry chemical piped systems to guard the two 75 kw diesel generators on each platform.

Generator Vital

Sinclair's safety director, Hadley Myers, explained that the primary protection on off-shore platforms is water pumped from the Gulf. Where crude oil is stored on the platforms, an automatic foam system is used to protect the tanks. The pumps which operate the water and foam systems are run by the diesel generator. This generator powers the air-conditioning, lights, cooking equipment, radio communications, the safety shut-off, as well as the fire pumps and can, therefore, be regarded as the key to the whole protective system. It is, therefore, vital that any fire originating in the generator itself be promptly extinguished.

This low-cost system consists of a tank containing 30 pounds of dry chemical placed outside the generator housing. Pipes carry the chemical to four nozzles within the hous-

(Continued on page 58)



Two 30-lb. chemical systems protect generator on off-shore oil platform. Pipes carry chemical inside housing.

TAME THE FIRE HAZARDS OF PAINTING: Part 1-Spray Booths

by **FRANK R. PITT**
The DeVilbiss Co.
Toledo, Ohio

Production painting or industrial finishing accounts for approximately 48.1 percent of all paint consumed in the United States, and utilized in 1960 about 321,800,000 gallons valued at $745 million. From 80 to 85 percent of these finishes were spray applied (including hand, automatic, electrostatic, airless, and steam methods), and the balance by dipping, flow-coating, brushing, roller-coating, blade and doctor knife, in that order.

To avoid fires and explosions in each of these processes, the fundamentals of fire prevention are:

1. **Adequate ventilation.**
2. **Removal of sources of ignition of flammable vapors and residues.**
3. **Good housekeeping.**

SPRAY BOOTHS

1. Location: Spray booths are the first line of defense in the finishing processes industry. Chapter 2 of N.F.P.A. Code 33 recommends that spraying operations should preferably be located:

a. In a one-story building,

b. Not located in basements because the flammable vapors from solvents used in spraying are heavier than air,

c. If spraying is done on upper floors, the floors and areas around the spray booth should be waterproofed and provided with adequate drains. This is good economics as well as good protection because water-damage to property beneath the spraying operation frequently exceeds the fire losses.

If spraying operations are not confined to a spray booth, the entire room containing spraying operations should be considered the spraying area, in which case, explosion-proof lights and motors may be required and insurance premium surcharges may be applied. All of these costs may be so substantial as to justify the installation of approved exhaust equipment.

2. Construction: Chapter 3 of Code 33 outlines how a spray booth should be constructed. Principal requirements are:

a. Rigidly supported booth manufactured from non-combustible material, such as steel (not less than 18 gauge), masonry or concrete.

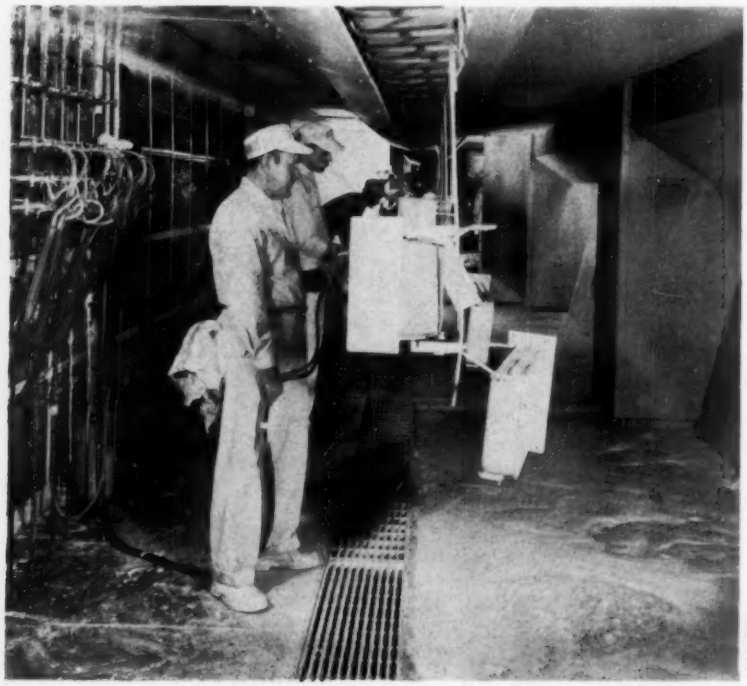
b. The interior should be smooth to facilitate cleaning.

c. The floors should be covered with a non-sparking, non-flammable material.

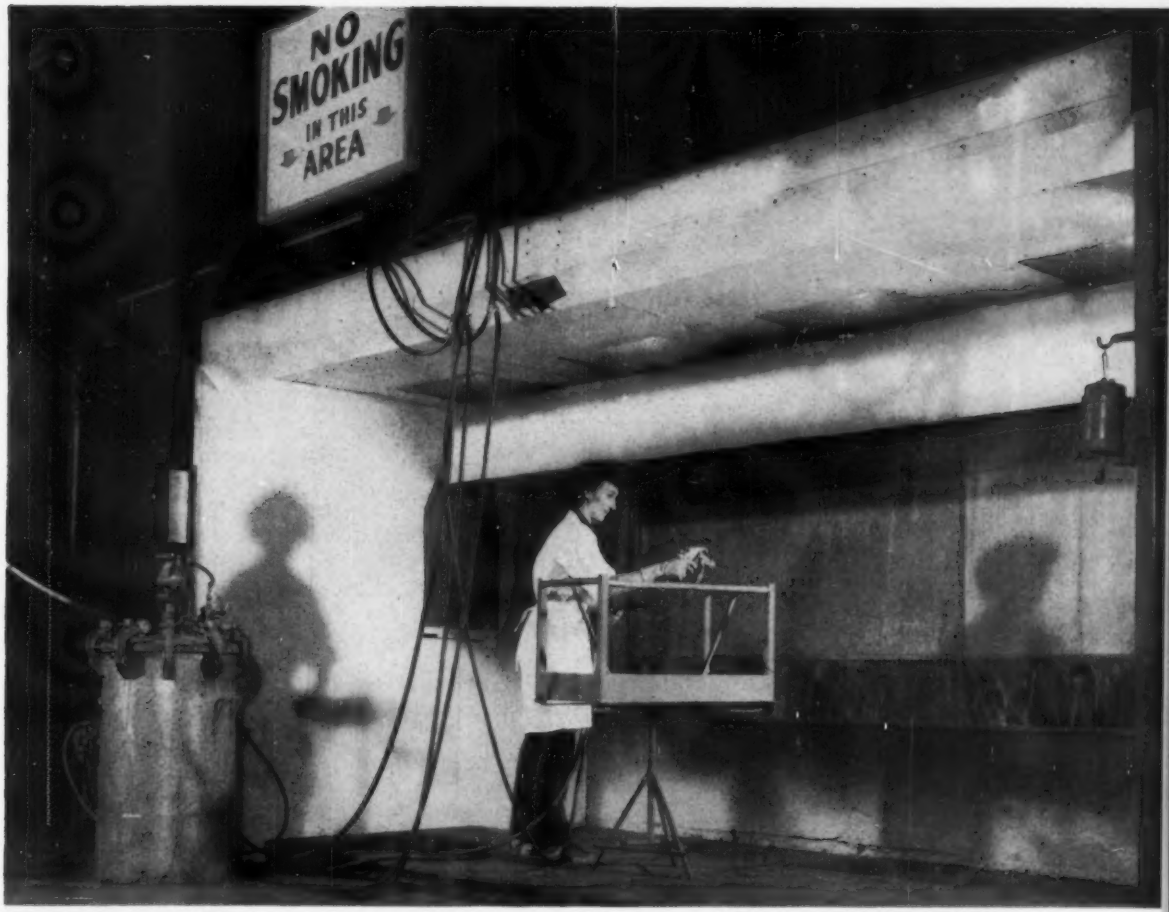
d. A fire curtain should be used on booths having a frontal area of more than 9 sq. feet.

It is interesting to note how this serves a dual purpose: First, it deflects the water from the sprinklers inside the booth down the face of the booth creating a water-curtain that prevents the spread of the flames outside of the booth. Second, it keeps most of the water spray inside the booth, thus tending to lower the temperature below the ignition point of the material supporting the fire.

e. Illumination should be provided through glass panels installed



Another water wash spray booth. Photo shows the filters used to secure a dust-free atmosphere within the booth.



In this view of a water wash spray booth, note lights shining through glass panels and conveyor opening.

in the top and sides of the booth to isolate the lights from overspray or flammable vapors. The glass should either be specially treated or wired glass, and lights installed on the open face should be guarded to prevent breakage.

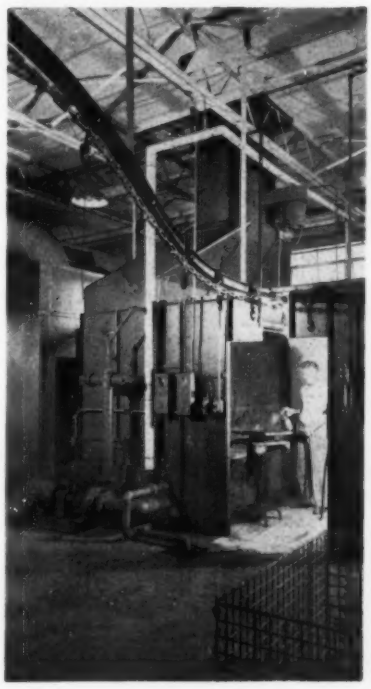
f. Where either dry baffle-type booths or dry filter booths are used, they must be balanced to ensure an even rate of exhaust; and where the filters are used, the following additional requirements should be met:

I. Visual or audible alarms when the air flow drops below 100 l.f.m. or such other rate of exhaust as is established as necessary to keep the atmosphere below the lowest explosive limits.

II. Strict maintenance so that dirty filters are promptly removed and disposed of—because there is a danger from spontaneous combustion.

III. A sprinkler should be installed in front of, and in back of the filter bank, and . . .

IV. The correct type of non-combustible filter approved by Factory Mutuals or Underwriters' Laboratory should be used. These filters may present a special spontaneous-combustion hazard if enamels, lacquer and peroxide bleaches are alternately used.



g. The proper spray equipment should be used in the spray booth, including guns, hoses, air and fluid pressure regulators, pumps and pressure tanks.

The latter should be of A.S.M.E. construction and we recommend that the safety valve be tested once

Prominent in this photo of the water wash spray booth is the conveyor for spraying small objects on turntable.

a week to make sure it is not inoperative.

3. Ventilation is our first line of defense and an outline of the requirements for good ventilation are set forth in NFPA Code 33, Chapter 5, and Code 91 entitled, "Standards for Blower and Exhaust Systems for Vapor Removal."

The three primary objectives in planning an exhaust system are:

a. To keep the concentration of flammable solvents below the lowest explosive limits. 100 l.f.m. is considered a minimum rate of ventilation, and this must naturally be increased when production rates are increased and automatic gang sprays are employed. Conversely, electrostatic applications require a lesser rate of exhaust.

b. To keep the concentration of toxic materials in finishes below the maximum allowable concentration as fixed by industrial toxicologists. If the latter standard is met, it will generally more than meet the requirements of our first standard.

c. To prevent over-spray from leaving the booth enclosure and depositing flammable residues around the painting operation.

The exhaust fan should have nonferrous blades to prevent sparking, and heavy deposits of overspray on the blades and surrounding duct should be avoided to eliminate friction fires. The fan motor must be installed outside of the exhaust duct, and all belts should be enclosed.

The exhaust ducts are important, too. They should be:

I. Substantially constructed (18–24 gauge steel), depending on diameter of duct, and well-supported.

II. Have a minimum clearance from combustible construction running parallel to the ducts and where the ducts pass through non-fireproof walls or roofs. The New York State Code requires an outer sleeve with at least a 1" air space between it and the duct. This outer sleeve should have two-inches of insulation around it, and the wooden roof adjacent to the opening should be covered with metal.

III. Locate the exhaust duct opening so that the exhausted vapors and overspray won't enter another building. 25 feet is considered a minimum safe distance. It is also wise to run the stack up at least 6 feet from the roof so that a minimum of paint will be concentrated at the stack outlet.

IV. Exhaust ducts should have cleanout doors every 12 feet.

V. Freshly painted objects should not be stored near open flames or other sources of ignition.

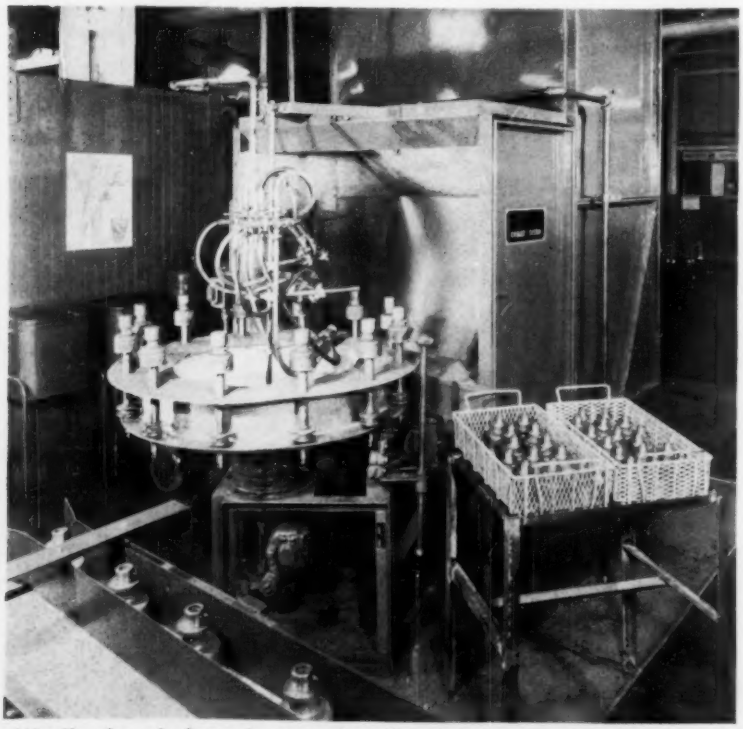
VI. Some states, such as New York, require an interlock between the spray gun and exhaust fan so that the fan must be in operation before air is available to the spray gun.

VII. In larger installations which are exhausting large quantities of air in cold weather, an air replacement system may be required to provide sufficient warm air to replace the air constantly being exhausted. Obviously, if there is insufficient replacement air, your exhaust fan will be starved; the volume of air being removed will not be sufficient to keep the atmosphere below the lowest explosive limits. Such air replacement units are readily available.

4. Illumination: Proper illumination and sound electrical installation not only aid in improving the quality of the finish that is applied, but also are principal safeguards against fire.

Chapter 4 of NFPA Code 33 spells out in detail what are considered to be good electrical installation practices. To my knowledge, no light or motor is approved for use *inside* a spray booth. (Sec. 405, and Note 2 of Code 33.) Explosion-proof lights and motors on which overspray is deposited may become so hot that the deposits will ignite. Of course lacquer dusts must not be deposited where they can become heated.

Lights should either be installed outside of glass panels incorporated into the top and walls of spray booths, as provided in Sec. 310, Code 33, or affixed outside of and on the face of the booth where they are not likely to be covered with overspray; as mentioned above under "Construction." Section 408 of Code 33 states that electric lights outside of, but within 20 feet of, any spraying area and not separated therefrom by a partition shall be totally enclosed to prevent the falling of hot particles if broken and shall be protected from mechanical injury.



Attention here is focused upon automatic rotary spray painting equipment.

Lights outside of a spray booth and not normally subject to exposure to flammable vapors do not have to be explosion-proof or vapor-proof. But they should either be enclosed to prevent falling hot particles if broken; or should be protected against breakage by location or guards.

Electric motors and wiring and other equipment outside the booth, but within 20 feet thereof, and not separated by partitions, should be Class I, Division 2, that is, not likely to produce sparks under normal operating conditions.

Note 4 of Code 33 strongly recommends the use of spray booths as a positive protection against fire and explosion. It says in part:

"When spraying operations are confined to adequately ventilated spray booths, there should be no dangerous concentrations of flammable vapors, nor deposits of combustible residues outside of the spray booth under normal operating conditions."

5. Electrostatic Apparatus: The electrostatic deposition of various types of finishes presents certain problems unique to that method of application and a modification of some of the conventional equipment used for automatic and hand spraying. This equipment utilizes a fundamental law of physics that if you charge the item to be painted with a positive charge and negatively charge the material being released from the spray gun or spraying disc, the material will be drawn to the object because of the latter's opposite polarity and be deposited thereon. The electrodes may carry currents up to 130,000 volts, but since the amperage employed is extremely low, the danger to personnel is not great, if proper precautions are exercised.

Chapter 9 of Code 33 requires that:

a. Transformers, power packs and control apparatus shall be located outside of the spraying area and a suitable space shall be maintained between the goods being painted and the electrodes or atomizing heads, which shall be at least twice the sparking distance as determined for that installation.

b. This method is generally approved only for painting which can be arranged on a conveyor so that a safe distance may be maintained between the goods and the electrodes, but new criteria have recently been established by the Finishing Processes Committee which may shortly result in approved electrostatic hand guns.

c. High voltage leads to electrodes and electrostatic atomizing heads should be effectively and permanently supported on suitable insulators and guarded against accidental contact or grounding.

d. Automatic controls which will operate without time delay to disconnect the power supply to the high voltage transformer and signal the operator should be incorporated to show the existence of any of the following conditions:

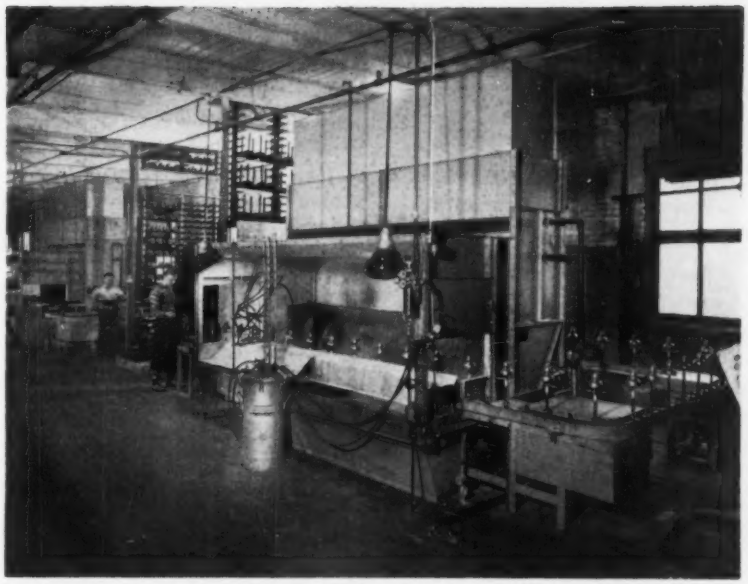
I. Stoppage of ventilating fans or failure of such equipment.

II. Stoppage of conveyor carrying material through high voltage field.

III. Occurrence of a ground or imminent ground at any point on the high voltage system.

IV. Reduction of clearance to less than twice the sparking distance.

e. As noted above in discussing ventilation, lesser rates of exhaust are permitted when electrostatic equipment is in use because a lesser amount of flammable vapors are released. The 100 l.f.m. recommendation in Section 912 of Code 33 is considered by most Finishing Room Superintendents employing this equipment to be excessive.



Further view of water wash spray booth and automatic chain-on-edge machine.

6. Operation: It is said that, "Cleanliness is next to Godliness," but in the finishing processes industry, "Filthiness puts you next to God—or the Devil," because an explosion can take you sky-high! Cleanliness in the finishing room—either the large industrial spraying operations or the corner body shop—is an imperative necessity.

Spontaneous Combustion

Heavy deposits of overspray may cause spontaneous combustion. Let's look at the actual Fire Record:

One-half of the spray booth fires started when spraying operations were shut down. The reason is that the cooling action of water wash systems, and the cooling due to the passage of large volumes of air over the deposits of overspray on baffles, filter banks or in the ducts, was absent during the shut-down periods. This situation permitted that extra build-up of heat that is incident to spontaneous combustion.

Spontaneous combustion is more likely to occur when lacquer and enamels are alternately sprayed, and special care should be taken where any of the peroxides are used as bleaches or catalysts.

Oil-impregnated rags are also a principal cause of spontaneous

ignition and should be promptly removed. It may be difficult to enforce these housekeeping rules, but their violation is the principal cause of spray booth fires.

The next largest group of spray booth fires started outside the booth and spread to adjacent combustible material. This points up the lessons that welding and burning should not be done close to the area where paints and thinners are stored or used, and that large quantities of paints and thinners should be stored in either cabinets constructed in accordance with Secs. 303–1 & 2 of Code 30, Flammable Liquids Code, or mixing rooms constructed in accordance with Secs. 7120/32 of that Code.

Other Fire Hazards

In large installations, it is customary to pipe the finishing materials from the mixing room to the various spray stations through circulating systems. This prevents the release of flammable vapors in areas where there is inadequate exhaust and a source of ignition might be present. The recent use of polyethylene or nylon tubing for this purpose is not considered good practice.

It should hardly be necessary to emphasize that no smoking should be permitted and "No Smoking" signs should be prominently displayed.

A special word about the organic peroxides. Their use is fairly new, and they are used in the plastics and molded fiberglas industries, which should utilize spray booths the same as the finishing processes industry does.

The organic peroxides, used as a catalyst, are introduced into the resin from a separate container, a thorough dispersion taking place just outside of the head of the spray gun. There are two particular notes of caution.

(a) Many contaminants such as iron rust can function as a reactive agent which cause these peroxides to heat up and release oxygen and other gases very rapidly; explosions have been known to occur when the high pressures inside the pressure tank could not be released rapidly enough.

(b) The other caution is to keep the dry resin dust (which may contain cobalt, used as an accelerator) from coming in contact with the peroxide used as a catalyst because these chemicals react violently and may set off a chain reaction. These peroxides may also explode if subjected to heat or shock.

A word about portable drying ovens. Most garages use either mobile travelling ovens that operate on a truck inside the spray booth, or employ banks of portable lights for the drying of touch-up work on doors, hoods and fenders. There should be no danger from these portable lights if they are used in the spray booth with the fan running. Because the volume of vapor being evaporated is so small and the volume of air passing through the spray booth is so great, the atmosphere will be well below the lowest explosive limits.

However, these portable lamps should not be used in areas where pans or open cans of gasoline, paint or thinner are about because they are readily knocked over, and if hot particles fall in such open pans or cans, trouble is likely to result.

The conventional mobile drying unit is safe when installed for use in a spray booth, as provided in Code 33. Once again, we see that adequate ventilation is of utmost importance. The ventilating fan should be interlocked with the oven so that the atmosphere will be kept below the lowest explosive limits.

The subject of industrial drying ovens is too extensive to be covered here, but I recommend that the wise precautions of NFPA Code 86, Class A Ovens and Furnaces, be religiously followed.

7. Sprinklers: The most effective form of fire extinguishment is a properly designed sprinkler system, engineered and installed in compliance with NFPA Code 13 entitled, "Standard for the Installation of Sprinkler Systems."

The characteristics of a spray booth fire are:

1. It is of extremely brief duration.
2. It burns with considerable intensity of heat.

For these reasons, sprinklers are necessary to control a spray booth fire. Generally, a sprinkler head for each 50/60 sq. feet of spray booth enclosure and only 12 feet of duct should be installed, and an adequate rate of discharge should be assured by installing proper sized water lines and providing adequate water pressure at all times. If the sprinklers are to be installed in exposed cold weather locations such as in the stacks of spray booths, give consideration to a dry pipe system in these locations. To assure both proper equipment and installation, consult with a representative of a reputable sprinkler manufacturer and your local Insurance Inspection Bureau.

8. Static Electricity: The NFPA Committee on Static Electricity has for many years continued its studies to determine whether there was any possible danger of the ignition of flammable vapors by static electricity generated at the point of discharge of the finishing material from the spray gun. The findings have always been in the negative.

Airless Painting

During the last four or five years, the so-called airless method of spray painting has enjoyed an increasingly wide acceptance. Our tests have shown that the spraying of certain materials containing low-boiling solvents does result in fires caused by static electricity. A potentially flammable vapor is created as the material is released from the spray gun, where it has been under pressures up to 2600 p.s.i. Atomization takes place as a portion of the solvent is converted into gas. As it rapidly expands after being released from the nozzle of the spray gun orifice, which has a diameter of from .009 to .036 inches, it creates static electricity, and such a static spark can ignite the surrounding vapor. This makes it imperative that proper exhaust equipment be used, and that both the spray gun and the object being sprayed be grounded if the atmosphere is above the lowest explosive limit. Some claims to the contrary, therefore, spray booths are necessary when using this equipment.

This article will be continued in the September issue.

Pictures by courtesy of The DeVilbiss Co. From an address presented at the 1961 Purdue Industrial Fire Control Conference.

Electrical Hazards

(from page 17)

them open on aisles, especially where there is truck or human traffic.

•Vertical doors or gates should have counterweights to prevent accidental closing on parts of the body. Even though preventive schedules may be excellent, the possibility of accidental closure should be considered and the lower edges of such doors or gates should be cushioned. Also if chains or cables are used to support such doors, it is better that two be used in case one fails.

•As floor space becomes more and more valuable, there is a tendency to build equipment high and locate comparatively inactive components towards the top. Use great discretion so that heavy parts will not fall on personnel during operation or during moving. Remember too that you must be able to remove such devices or subassemblies safely for maintenance.

•Modern production equipment is often so huge that it requires catwalks, ladders, stairs, etc., not only for operation but for maintenance. It is extremely important that there be ample room for a firm foothold, especially where electrical maintenance is to be performed. The possibility of the electrician jumping back from a shock demands room so he will not fall off from the surface on which he is working. Likewise, to lift or handle heavy objects from these elevated positions, similar precautions must be taken.

Muscular Injuries

Sometimes the injuries that may be suffered on electrical equipment may be more serious than simple flesh wounds. These involve strains, dislocations, or even more serious injuries. For example, very tall equipment may be so top heavy that it tips over during operation or at other times. Equipment which is to be lifted manually should have hand-holds to make sure it can be lifted without suffering body injury.

Quite often in the design of equipment, it is assumed that it will be used in a given place, but not sufficient thought is given to the problems of moving it. All heavy electrical equipment should be properly braced, so that it cannot fall during transit or bend supports which might fail during operation later. Any apparatus which contains glass or other fragile materials should be properly braced to prevent injury to those handling it.

Internal Injuries

One would not ordinarily consider that electrical equipment could cause internal injuries. However, other features associated with it could develop fumes injurious to personnel. Internal combustion engines, for example, used for emergency power supplies, may develop carbon monoxide gas which is well known to be lethal. Engines should be properly vented or installed in areas where the fumes will not be harmful. Any equipment using teflon in the vicinity of fires should be checked. Under certain conditions the teflon if overheated can give off dangerous fumes or vapors that may be extremely dangerous. These should be properly vented.

Radiation Hazards

One of the industrial hazards that is beginning to interest the Atomic Energy Commission is the generation of X-rays. Any high voltage power supply that uses vacuum tubes at voltages over 10,000 volts is likely to develop X-rays. In such cases certification is even now required that such equipment does not develop X-rays in excess of permissable limits. To demonstrate this, it is necessary to affix X-ray films to the equipment. Incidentally, this is not too serious a problem at least with low power tubes and is easily controlled by the use of shielding material around the rectifiers involved.

In certain types of leak detectors and in other measuring equipment, small amounts of radioactive material are used for the development of energy for the detection of the leaks and for other testing purposes. Usually these amounts are so small that no hazard is involved. However, if they are in use in any plant, they should be checked to make sure that permissable limits are not exceeded.

16mm Industrial Safety Films

IT'S IN THE CARDS (18 min.)

". . . deals with the problem of . . . carelessness and chance taking . . . the film is so excellent . . . that it's highly recommended as a supplement and attitude builder in any program."

Association of Casualty & Surety Companies

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". . . deals with . . . familiar personal attitudes which are responsible for either safety or tragedy . . . the film has impact and suspense; it is an excellent job."

Association of Casualty & Surety Companies

"In our estimation this is the most excellent film we have ever seen on safety."

Swivelier Company, New York

For a complete list of 16mm sound Industrial Safety Films write or telephone

International Film Bureau, Inc.
332 S. Michigan Ave.
Chicago 4, Ill. HArrison 7-4546

(For details, use Key # H-8 on card on page 33)

Injuries to the Sense Organs

Eyes: The eyes must be protected from injuries which may develop from using electrical equipment. The commonest danger is that of glare. If an operator is required to work with a nearby light shining or reflected into his or her eyes for a long period, not only will efficiency be affected but damage to the eyes may result. Typewriter and business machine manufacturers have for quite a few years deleted chromium and other highly plated surfaces in favor of dull surfaces to avoid reflections. This change should be considered for all equipment. Besides the discomfort of glare, accidents may result from dangerous movements while the eyes are blinded by lights.

Where sparks are produced, care should be taken to prevent them striking the eyes of any personnel. Maintenance people working on live circuits should be compelled

to wear glasses or goggles because of the possibility of sparks during trouble shooting. Especially when a man is tense he is very likely to cross hot terminals with a screwdriver or pair of pliers. Not only can the sparks do physical damage by burning the eyes, but when the spark is of very high intensity the ultraviolet component of light may seriously damage them.

Eye-Damaging Rays

Mercury vapor lamps, sterilamps, and other special types of lamps give off ultraviolet light which is very uncomfortable and causes conjunctivitis giving the feeling of having sand in the eyes. Also, there is some debate as to the danger of infrared light to the eyes. Some eye specialists warn that infrared has a tendency to weaken the eyes, causing one to require more and more light as one grows older. It is said that this takes anywhere up to ten years to develop and there is some possibility that this is true. This has been denied by other authorities, but we are currently investigating the possibility.

Other eye injuries may be caused by long thin objects pointing in the direction of the observer, especially when a maintenance man is required to work in haste and oftentimes in the semi-dark. Such protuberances should be avoided, or, if absolutely necessary, be well covered in such a way as to be immediately obvious.

Hearing: Safety authorities in various states and some labor departments are becoming very conscious of noise levels. Some courts have awarded compensation to persons who have lost some part of their hearing because of work conditions. There probably would be more laws in effect even now on the subject had some standard of discomfort and danger been reached.

Noise Control a Plus

Not only is it humane to consider the reduction of noise, but the increase in efficiency, the improvement of employee relations, plus reduction of accidents due to nervousness all will make worthwhile any effort to reduce noise levels.

"Here you see the plant electrician being shocked."

Incidentally, it is amazing how readily noise can be substantially reduced.

Warning Alarms

Sometimes it is absolutely unavoidable that certain dangerous conditions exist during the operation of equipment. At such times alarms must be sounded to call attention to all concerned. Loud, continuous alarms are often so annoying that operators and other personnel cut the wires or stuff the bells thereby invalidating them as warnings. One way to prevent this sabotage is to use bells that sound only one note each time the fault or warning occurs or in the case of sustained danger a single note operating at 5 or 10 second intervals with perhaps a warning light on continuously. Considerable ingenuity is required in installations where there are many hazards and each one must be identified by a different type of alarm. Obviously, the simplest solution is to have a single alarm sound for all conditions and have an annunciator or other type of indicating panel indicate exactly where the fault is. However, in large installations, it may be necessary that personnel recognize the location of a particular danger by the sound of the bell. After one has exhausted the variety of commercially available audible alarms it sometimes becomes amusing how the ingenious designers invent new sounds. Currently we have a variety of devices where the fault causes the operation of solenoid valves, releasing air to operate various types of whistles, hisses, burps, etc.

When All Else Fails

Despite all the precautions, all preventive measures are subject to man-made errors. The unpleasant possibility must be faced that accidents may still happen and that it will be necessary to shut off equipment quickly to prevent electrical shock or other physical injury. For that reason all equipment should be controlled by one main switch wherever possible and that main switch should be painted a brilliant red with a sign reading, "Main Switch." In addition all supervisory and maintenance personnel should be trained in artificial resuscitation.

From an address presented at the 30th Greater New York Safety Convention. Pictures by courtesy of Westinghouse Lamp Div.

24-Hour Job

(from page 11)

pany's factories were urged to work with local police and safety organizations.

Mr. Bergmann said that letters and copies of the conference proceedings outlining the program would be sent as soon as possible to vice-presidents of the company and managers of its organizations.

Dr. B. J. Campbell, assistant director of automotive crash injury research at Cornell University, reported to the conference earlier in the day on the effectiveness of seat belts in reducing injuries in motor vehicle accidents, the nation's third worst killer, after heart disease and cancer.

In preventing passengers from being thrown out of automobiles, seat belts reduce substantially the chances of fatal injury, he said. He observed that those ejected from cars during accidents are two and a half times more likely to be killed than those who remain inside.

Dr. Campbell also cited data from a study in California showing that belt wearers suffered 35 percent fewer major and fatal injuries than those who did not wear belts. He said the belts were most effective in rollover and side impact accidents, the type in which passengers can be ejected most frequently.

General Electric Company's Small Aircraft Engine Department in Lynn won the Grand Trophy Award of Associated Industries of Massachusetts as the company with the state's best record of improvement in accident reduction.

This company's three-year safety record was cited by Charles L. O'Reilly, president of the Massachusetts Safety Council, and by Robert A. Chadbourne, executive vice president of Associated Industries of Massachusetts, as the most noteworthy safety achievement among companies enrolled in the Council's Industrial Safety Contest.

The Grand Trophy Award, a bronze plaque emblematic of safest operation in industry, was presented to General Electric Company during the first day of the 40th Massachusetts Safety Conference in April.

General Electric's safety achievements included special awards for accident reduction in record and for "meritorious achievement" in operating without a single disabling accident during nearly five million man-hours of production. The company's accident frequency rate is five times better than the national average of plants in the special machinery classification.

Fifty-four other safety citations were presented to companies judged safest in their manufacturing classifications. A second place award was presented to Sylvania Electronic Systems, Waltham Laboratories, and Special Awards went to Sylvania Electric Products, Inc., Danvers Plant, one year without a disabling accident; Sylvania Electric Products, Inc., Salem, two years without a disabling accident; Sylvania Electric Products, Inc., Ipswich Plant, three years without a disabling accident.

An Honorable Mention Award was presented to Boston Gas Company for continued improvement in its record.

• • •

The National Safety Council's Award of Merit was presented to the Liquid Rocket Plant of Aerojet-General Corporation in recognition of a standout safety record during 1960. The presentation was made to Robert B. Young, Aerojet Vice President and Manager of the Liquid Rocket Plant, by W. A. Huggins, Manager of the Sacramento Safety Council.

Aerojet's safety record at the Liquid Rocket Plant not only is one of the outstanding safety achievements in the United States rocket industry, but it also saved an estimated $2.5 million during 1960. Based on the California average of 34 out of every 1,000 jobholders disabled during 1960 compared to 1 out of 1,000 at the Liquid Rocket Plant, more than 200 employees were spared from pain and financial loss.

• • •

The Lammot du Pont Safety awards, highest honors available for improvement in chemical manufacturing safety, were presented to Escambia Chemical Corporation and the Chemical and Metallurgical Division of the General Electric Company.

The two companies were honored during the 89th Annual Meeting of the Manufacturing Chemists' Association which administers the awards. Bronze plaques commemorating the awards were presented to officers of the companies by R. C. McCurdy, outgoing chairman of the board of the Association.

The safety awards are presented each year to the two companies which show the greatest percentage of reduction in their average disabling injury frequency rate for the past two-year period, compared to their rate for the immediately preceding three years. One award is for companies with less than two million man-hours of annual work time and the other for companies exceeding two million man-hours.

In winning the award in the larger company category, General Electric reported an injury frequency rate for the years 1959–60 of 1.685, a reduction of 61 percent from the 4.362 rate of the preceding three years.

Escambia Chemical, winner in the smaller company category, reported an injury frequency rate for 1959–60 of 1.525, a reduction of 79 percent from the rate of 7.287 during the three prior years.

Runner up to General Electric was Mallinckrodt Chemical Works, with a 54 percent reduction. Runner up to Escambia Chemical was Continental Oil Company with a 74 percent reduction.

• • •

Employees and management of the Curtis Bay Works of W. R. Grace & Co., Davison Chemical Division have received the Certificate of Achievement of the Manufacturing Chemists Association "in recognition of their achievement in the prevention of personal injuries, operating without a disabling or

lost-time injury for the entire year of 1960," the company announced. The certificate was presented to R. N. Holden, managing director of the works, representing the employees, by H. B. DeVinny, vice-president of Davison, who said that the safety record was the result of a long-term safety program in effect at all Davison plants.

Mr. Holden pointed out that the 1960 achievement meant that the plant worked 1,359,437 man-hours without a disabling injury. Average employment at the works is currently 875. Since April, 1948, the employees have 11 times worked one million man-hours without a disabling injury.

• • •

The first industrial safety award of the New York State Optometric Association was received at the association's 66th annual convention by Robert A. McVety, safety director of the Remington Rand Division, Sperry Rand Corp. The award will be made each year to an individual adjudged by the group to have made an outstanding contribution in the field of industrial vision.

Dr. Robert T. Frankel of Beacon, N. Y., association president, said that Mr. McVety was selected as the first recipient because of his 30 years of devotion to the visual safety of industrial workers. "One of Mr. McVety's outstanding accomplishments," said Dr. Frankel, "was to introduce into Remington Rand the Wise Owl Club of the National Society for the Prevention of Blindness. In the seven years the program has been in operation 99 Remington Rand employees have been enrolled because proper eye protection has saved their eyesight."

• • •

The Portland Cement Association's Tennessee District has received one of the nation's most coveted safety awards in recognition of a rush-hour radio traffic roundup that balances life-saving tips against fatal statistics.

Presentation of an Alfred P. Sloan Award for the five-day-a-week program on Nashville Station WLAC was made to District Engineer John L. Feagin in recent ceremonies at the Waldorf Astoria Hotel in New York.

The Sloan Radio-TV Award, one of the highest offered to commercial sponsors of safety programs, climaxed a series of local, regional and national contests sponsored by the National Safety Council. Winners cited with PCA for outstanding public service in highway safety for 1960, received bronze plaques from Mr. Albert Bradley, Chairman of the Alfred P. Sloan Foundation.

The five-minute "Daily Traffic Safety Report" was first aired by the Portland Cement Association in 1956, a year in which Tennessee experienced the most disastrous highway fatality record in its history. The show's format was designed to give listeners rush hour coverage of daily highway fatalities. Up-to-the-minute statistics obtained in "beep" telephone interviews with the State Commissioner of Safety and his top assistants are reported and compared with records for the same date and month of the previous year.

Safety officials are also interviewed to present safe driving tips. These interviews are beamed to listeners throughout Tennessee and 11 adjoining states.

In addition to complete weekday coverage of the Tennessee traffic situation, special appeals from the Governor, Safety Commissioner and other civic officials are broadcast to motorists on critical holiday week-ends when driving conditions are especially hazardous.

• • •

The General Electric Atomic Products Division has the best 1960 safety record of any division in the company, according to Dr. Lyman R. Fink, division general manager. The division, made up of the Atomic Power Equipment Department (APED) at San Jose, Calif., and the Hanford Atomic Products Operation (HAPO) at Richland, Wash., has demonstrated that atomic installations can achieve better safety records than other industrial operations, Fink stated.

APED employees have compiled more than four million man-hours of safe work during the last 13 months without a disabling accident, while HAPO recently reached an all-time record by working safely for more than 11 million man-hours.

The Hanford Atomic Products Operation plant recently received the National Safety Council's Award of Honor for completing more than a year's work without a disabling accident.

Chemical Processing Department employees worked 3,126,646 man-hours (426 days) without sustaining a disabling injury. This was the third Award of Honor from the council. To qualify for this safety tribute, a component must work more than 3,000,000 man-hours without a disabling injury.

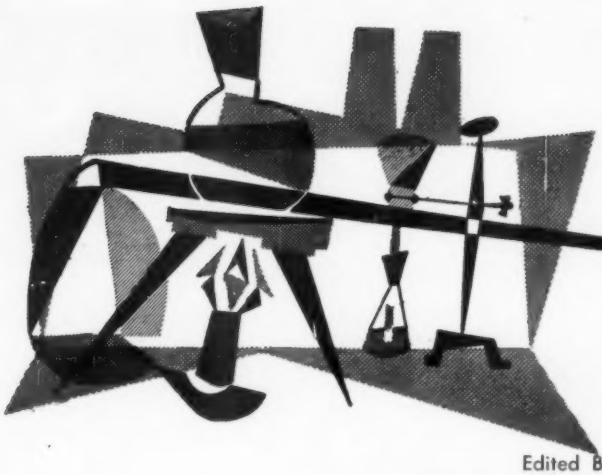
• • •

The San Francisco maintenance base employees of United Air Lines have been awarded a plaque representing the Award of Honor from the National Safety Council. The award is in recognition of an accident frequency rate 65 percent below the industry average for the 4,000 employees at the base.

Personnel Procedures In Nuclear Operations

The Atomic Energy Commission is making a survey of all 54 licensees operating nuclear reactors and critical experiment facilities to determine the type and size of operating, maintenance and health physics staffs in actual use at each facility. Purpose of the survey is to obtain comprehensive information on the current staffing of licensed reactor operations. Licensees also are being invited to comment on their experience to date with their staffing procedures.

Information from the survey will provide data for possible development of criteria for minimum size of operating staffs for the various types of reactors and critical experiment facilities. Present procedure followed by AEC is to review the applicant's proposed operating organization in connection with each application for a facility license. Under AEC regulations, at least one licensed reactor operator must be present in the control room when the reactor is operating.



industrial hygiene

Edited By
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Industrial Toxicologist and Hygienist

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"Manual of Methods of Air Pollution Control"
"Monographs of Industrial Hygiene"

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Fellow American Institute of Chemists
American Chemical Society
American Academy of Forensic Sciences (Toxicology Section)

Air Pollution Control Library

Dr. H. E. Hilleboe, Commissioner of Health of the State of New York has announced the inauguration of a technical library and an audio-visual service specializing in air pollution control. The library contains more than eight thousand microfilmed books, articles, and scientific papers. Film strips and motion pictures are also available. Library privileges and loans of material may be arranged by scientists, educators, and engineers in the state. For further information write the New York State Air Pollution Control Board, 84 Holland Avenue, Albany 8, New York.

Handling an Air Pollution Problem

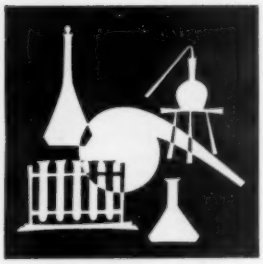
G. E. Pendray in a recent article in the *Public Relations Journal*, offered the following sound advice to industries faced with air pollution problems:

Do not attempt to use smooth words or empty promises as a substitute for remedial technical action. Do not ignore protests, or deny the existence of a problem, without investigating to make sure. Do not call the complainers "pinks," troublemakers, or Communists. Do not deny the facts—and certainly not when the evidence is plainly against you. Do not take refuge in legalistic tactics, dodging, bluster or silence. Do not attempt to justify air pollution on economic grounds—with such phrases as "more smoke means more jobs"—"if the town wants our taxes it will have to put up with some of our fly ash," etc. Do not take comfort in the idea that the complainers are the company's own employees, suppliers, or other dependents—"and they wouldn't dare carry the complaints too far." Do not assert that the "plant was here first, and the complainers should have known better than to build their houses so near to it, if they are so sensitive." Do not threaten to move the plant to another community—unless you mean it; your bluff may be called. Do not try to get out of responsibility by pointing an accusing finger at the other fellow. In the experience of the author, he has seen every one of these approaches tried, and seen them fail. They are almost a guarantee of trouble. Sometimes they can change a simple complaint against air pollution into a major public relations disaster. If the company's community relations are bad, dealing merely with air pollution complaints may only be treating the symptoms. When air pollution complaints are persistent, consider whether the real trouble may not lie elsewhere. An inexpensive professionally-conducted field check will soon indicate whether this is in fact the case. If it is, the only lasting answer is to correct the basic cause.

Congress on Environmental Health

The University of Michigan School of Public Health and the National Sanitation Foundation in cooperation with the American Public Health Association have recently sponsored the Second Congress of Environmental Health at the University of Michigan, Ann Arbor. The purpose of the congress was to—"explore environmental resources and their value and usefulness for man in terms of needs for industry, government and conservation—in keeping with health, social, and economic trends." Participation was by invitation and included 100 representatives from public health agencies, 100 from industry, and 50 from the public at large. Information regarding the proceedings may be obtained by writing Dr. H. E. Miller, School of Public Health, University of Michigan, Ann Arbor, Michigan.

INDUSTRIAL
HYGIENE
MONOGRAPH
#1



by **MARK M. LUCKENS**

Hydrogen Sulfide

A. Occurrence

Although hydrogen sufide is not used as such in industry, it is nevertheless an important industrial hazard. It is formed in such industrial processes as the refining and distillation of petroleum, tanning, glue manufacture, spinning of viscose rayon, vulcanization of rubber, and the treatment of sewage. The use of this gas in analytical chemistry constitutes a definite but usually unrecognized hazard.

Hydrogen sulfide ("stink damp" as it is called by miners) is found wherever sulfur or sulfides are present. It is found in coal, sulfur, and gypsum mines, as well as in petroleum and natural gas wells. The gas is also produced during the decomposition of organic matter containing sulfates. The characteristic odor of rotten eggs is noticeable in polluted streams and anaerobic sewers.

B. Physiologic Response

Hydrogen sulfide is a highly toxic, irritant gas. Although possessing a characteristic unpleasant odor ("Rotten eggs"), this warning property is negated by the fact that the sense of smell is paralyzed after a few minutes exposure to the compound. The inhalation of 800 ppm (0.07%), or more of the gas may prove fatal. Though initially irritating, this is overshadowed by systemic effects which are caused by the presence of H_2S in the blood stream.

The gas is readily absorbed into the blood stream. When the concentration exceeds that which can be readily oxidized, hyperpnea results and may be followed by paralysis of the respiratory center of the brain. The accumulation of hydrogen sulfide in the blood causes systemic poisoning. The nervous system is especially affected.

Exposure to concentrations of 400 to 700 ppm for a half hour or more is extremely dangerous. Severe irritation of the eyes and respiratory system are outstanding symptoms. The inflammation and edema of the lungs may prove fatal. The higher concentration can cause systemic symptoms or respiratory failure.

Concentrations of 500 ppm and above cause severe irritation of the eyes and respiratory tract. Pneumonia or serious injury to the lungs is likely to result. Prolonged exposure may result in fatality.

Exposures on the order of 250-500 ppm cause headache; dizziness; excitement; nausea; gastro-intestinal symptoms; dryness and pain in nose, throat, and chest; and coughing.

Exposure to 70–150 ppm will give symptoms of irritation and respiratory discomfort, after 1 hour. Concentrations of 170 to 300 ppm cannot be tolerated for more than 1 hour, without serious consequences. Severe irritation of the eyes and respiratory system results. The eyes are affected after exposure of 6–8 minutes.

Exposure to atmospheres containing 50 ppm and more result in visual symptoms. The effects may include a feeling of "sand in the eyes," inflammation, swelling, smarting, itching, cloudy cornea, destruction of the epithelial layer, and scaling resulting in blurred vision. Exposure to light may increase the sensation of pain. Repeated exposure may cause ocular irritation or serious damage to the eyes. There have been reports that hydrogen sulfide can cause delay in the healing of wounds.

Breathing an atmosphere containing 1.5 milligrams per litre will result in unconsciousness and death unless treatment is instituted immediately. Exposure to a concentration of 0.75 milligrams per litre for 15 minutes is dangerous. Hydrogen sulfide approaches hydrogen cyanide in its toxicity and speed of action. It has been claimed that frequent exposure to low concentrations of this gas leads to tolerance while exposure to a high concentration results in sensitization.

Exposure to high concentrations of hydrogen sulfide may result in almost immediate death. When the concentration is 1:1000 or 1:2000, minutes or hours may pass before the fatal effect. In non-fatal cases, recovery takes place in several hours to as much as a day or two. Recovery from sub-lethal doses is usually complete. Occasionally pneumonia, psychic, or neurologic disorders do occur.

The maximum allowable concentration for an 8 hour industrial exposure is 20 ppm. The odor of H_2S is detectable at concentrations as low as 0.025 ppm; and is distinct at 0.3 ppm, intense at 3 to 5 ppm and marked at 20 to 30 ppm. At higher concentrations, the odor is not more intense than at 200 ppm.

C. Chemical and Physical Data

Formula: H_2S

Molecular Weight: 34.08

Usual State: Colorless gas, at normal temperatures and pressures

Odor: a. "Rotten eggs"
b. "Sweetish" in high concentrations

Odor Threshold: 0.025 ppm

Density: a. Slightly heavier than air (1.19; air=1.0)
b. 1.539 gms/litre (gaseous state)

Melting Point: –82.9°C

Boiling Point: –61.80°C

Solubility: 437 cc/100 ml water (0°C)
186 cc/100 ml water (40°C)
9.54 cc/100 ml alcohol (20°C)
Soluble in petroleum solvents, crude petroleum, carbon disulfide

Flammability: Ignites at 558°F; burns in air to yield SO_2 and H_2O

Explosive Limits: 4.3% to 46%, by volume, in air

Corrosivity: Hydrogen sulfide is corrosive. It reacts with many metals to form sulfides
1 ppm = 0.0014 mg/L @ 25°C, 760 mm Hg
714.3 ppm = 1 mg/L

D. Treatment

It should be remembered that there is no antidote for hydrogen sulfide. The victim must be removed immediately from the contaminated atmosphere to fresh air. The administration of a mixture of 92.5% oxygen and 7.5% carbon dioxide will combat respiratory depression and help overcome the effects of the absorbed poison. Treatment is mainly supportive and includes administration of respiratory stimulants, and the maintenance of body temperature.

E. Prophylaxis

The MAC for hydrogen sulfide must be observed at all times. Do not rely on the "odor of rotten eggs" to give warning. The sense of smell is rapidly paralyzed by this gas. Air-line face masks must be worn when entering highly contaminated areas. Safety harness and a lifeline attended by a responsible individual should be provided. Adequate ventilation should be provided for all processes producing volatile sulfides. Workers should be alternated between jobs requiring exposure to H_2S and jobs in uncontaminated air. Frequent "breaks" in uncontaminated atmospheres are recommended when this is not possible.

A Personal Air Sampler

Two British scientists have devised an air sampler which can be carried easily and unobtrusively by an employee. The device performs a function similar to that of the film badge for measuring exposure to radiation. It will indicate the average concentration of atmospheric contaminant to which a worker has been exposed over his working period. An electric motor, operated by mercury batteries which have an operational life of either 30 or 100 hours, drives a diaphragm at constant speed. The air flow depends on the resistance of the filter paper through which the pump aspirates. This is recorded on a graph which also indicates the power consumption. The pump employs a polytetrafluoroethylene diaphragm. The valves are made of aluminized Melinex film and a Teflon eccentric.

The 30-hour model fits into an ordinary bicycle lamp case, weighs one pound, and can be carried in the pocket. The 100-hour model incorporates an electric clock to indicate total flow. It weighs two pounds and can be worn attached to a belt. These devices have been used in monitoring exposure to radioactive dusts. Their use for monitoring exposure to toxic vapors has been suggested. This may be accomplished by substituting silica gel or other absorbents in place of the filter paper.

Threshold Limit Values

Maximum Acceptable Concentrations

A recent paper indicates that the MAC's of dusts and fumes as reported in Russian industry are lower than those recommended by American industrial hygienists. Some 180 MAC's were compared. The greatest differences between American and Russian data were found in the values of organic solvents, particularly chlorinated hydrocarbons. The MAC's for some dusts and fumes were similar to those used in this country. In the case of irritant gases, the differences between both sets of values were much less. It appears that the Russians rely, for their data, on extremely sensitive studies involving conditioned reflexes of animals. It seems that in this instance Russian industrial hygiene practice sets high standards.

Rehabilitation Center Achieves Goal; Closes Down

Employers Mutual of Wausau, which in 1928 opened the first insurance company rehabilitation center in the nation, achieved a unique goal recently when the center was officially closed because there no longer was a need for the public services it offered.

"The Wausau rehabilitation center was originally set

(Continued on page 54)

The HOW of Noise

What's all the noise about NOISE?

When you consider the results of excessive noise in industry—the adverse effect on efficiency, morale, and safety, the insidious danger of hearing loss and subsequent generous compensation payments—you might wonder why there isn't MORE noise about noise.

Noise, in fact, might be accurately defined not only as unwanted sound, but also as "the last frontier of safety." And management has been somewhat reluctant to even discuss the subject, the theory being a weird combination of "ignoring the so-and-so, maybe he'll go away" and the desire to avoid flagging employees' and union attention.

To the safety engineer, then, falls the responsibility of determining the extent of the noise problem, convincing management to apply time, effort, and money to combat it, and eliciting cooperation from both supervisor and employee to solve it!

The fundamentals of noise measurement, analysis, and control have been widely discussed, both in *Safety Maintenance* and other trade magazines. Literature on the subject is available from manufacturers and professional organizations. Thus, no attempt will be made here to duplicate that information! Rather, the diagnostic sound measuring and analyzing tools available will be described, and a simple, yet effective, noise control program will be outlined.

Sound Measuring & Analyzing Instruments

The Sound Meter

Small and lightweight, the sound meter is the most convenient instrument to use when an initial survey of noise levels is required. A typical commercial sound meter is shown in Fig. 1. This particular sound meter is fully transistorized, its weighting circuits were designed to the new 1961 ASA Standards, and the direct scaling step attenuator eliminates reading errors. The illustration also indicates the few simple controls found on the usual sound meter, thus permitting use by non-technical personnel.

Fig. 1—Transistorized Sound Meter for surveying noise levels. Portability allows convenient use on field trips.

The sound meter, being inexpensive and compact, however, has its limitations: Its crystal microphone will become damaged when exposed to more than 120° F or extremes of humidity; while it will give a quite accurate indication of sound pressure level and a rough estimate of frequency components, more precise information on input noise and frequency components is often required. In fact, noise levels of more than 85 db on either the B or C weightings definitely indicate use of the sound meter's big brother—the Sound Level Meter—and several of his more sophisticated cousins—the impact noise analyzer and the sound analyzer.

The Sound Level Meter

Heart of a complete sound measuring and analyzing system is the ASA Standard Sound Level Meter. The Sound Level Meter performs the same basic function of measuring sound as its little brother, the sound meter. But, from that point on, the similarity ends. The Sound Level Meter, as well as having several additional operating controls, has provision for a wide

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Noise Control SERIES

Other Articles: July and September

Control

by **WILLIAM F. GLASER, JR.**
H. H. Scott, Inc.
Maynard, Mass.

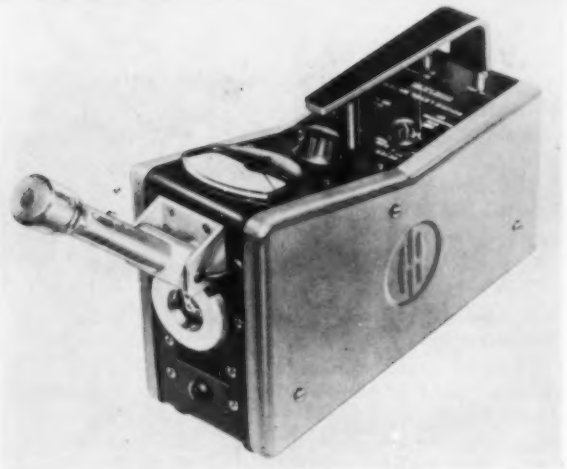

Fig. 2—1961 ASA Standard Sound Level Meter, featuring a ceramic microphone for use in high temperature conditions.

variety of accessories and provides sufficient output for further analysis.

The most recently designed Sound Level Meter is shown in Fig. 2. Since most Sound Level Meters in the past have used a crystal diaphragm microphone (similar to that found in a sound meter), an accessory microphone, which will withstand high temperature and humidity, was often required. The Sound Level Meter in Fig. 2, however, has a ceramic microphone as standard equipment, and thus will stand high humidity and high temperature without damage.

Fig. 3—Noise can be an annoyance and a hazard in office. Meter is used to tell effect of new sound-proof enclosure.

Calibration (or making sure an instrument means what it says) is also an extremely important factor. To ensure consistent, accurate readings, the safety engineer must make sure that field handling does not affect calibration.

Several different methods of field calibration are available, including a second matched microphone, electric calibration (sometimes built-in, but checks amplifier only, not entire sound level meter), and acoustical calibrators (consisting of an acoustic calibrator and oscillator). The Sound Level Meter shown in Fig. 2 is unique in that it contains a built-in electro-acoustic calibrator, thus ensuring dependable readings regardless of field handling.

Sound Analyzers

Exact knowledge of sound levels is, of course, not enough. To illustrate—100 db noise at less than 150 cps frequency is not nearly as harmful (or annoying) to the average person as 90 db noise at 3000 cps. It is extremely important, then, to know exactly what the

Table I—Noise Problems and How to Handle Them

Problem	Analysis Required	Equipment
Do we have a noise problem?	General plant and office survey	Sound meter or Sound Level Meter
Noise level at possibly dangerous level (over 85 db)	Frequency analysis to determine noise level in critical—300 to 4800 cps—range	Sound Level Meter and Octave Band Analyzer or Half Octave Band Analyzer
Impact noise present, contributing to over-all noise level	Impact noise analysis	Sound Level Meter and Impact Noise Analyzer

frequency components of the noise are, especially when overall noise level is over 85 db. Analyzers, as accessory equipment to the sound level meter, perform this function.

Of the major types of analyzers—octave band, half octave band, third octave band, and narrow band—only the first two are generally suitable by reason of both portability and cost for industrial noise control.

The Octave Band Analyzer is an extremely portable device which permits simple and rapid analysis of noise. It operates directly from the output of a sound level meter and determines noise level in each of 8 or more octave bands. One particularly portable octave band analyzer is available as a plug-in accessory for the sound level meter shown in Fig. 2.

The Half Octave Band Analyzer is used to attack complex problems of noise control, such as a machine enclosure where that machine is a dominant factor in total noise level, and where octave band resolution is not quite precise enough. Again the half octave band analyzer operates from the output of a sound level meter, and may be carried and used with the sound level meter.

Table II—Typical Sounds and What They Do

Typical Sounds	Sound Pressure Level (decibels)	Resulting Effects
Rustling leaves on a still night	0–20	
Quiet home (no children) Broadcast studio	20–40	
Quiet office	40–60	
Normal conversation	60–70	
Noisy office, department store	70–80	Telephone conversation difficult
Heavy traffic	80–90	Possibility of hearing damage if noise is "pure tone" from 300 to 4800 cps; adverse effects on human efficiency.
Subway train	90–100	Possible psychogenic ailments, such as fatigue, headache, loss of neuromuscular coordination, or nausea.
Heavy machine shop	100–110	Prolonged exposure results in hearing loss.
Boiler factory	110–120	Immediate discomfort
Large pneumatic riveter	120–140	Immediate ear pain
Air raid siren	140–160	Immediate ear damage
Jet plane at take-off, rocket engines	Over 160	Killing level for rats and mice

Fig. 4—To show use of sound meter in riveting operation, "mike" placed near operator's ear determines effect of noise.

Impact Noise Analyzer

Although much research has already been done on the effects of impact noise, much more remains to be done. It is not yet possible to determine exactly what role impact noise plays in hearing loss, but it now appears probable that impact noise is potentially more dangerous than continuous sound of the same *average* level as indicated on a sound meter. Thus, analysis and control of impact noise is an indispensable part of any complete noise control program.

Impact noise analyzers (or peak noise indicators) are also available as plug-in accessories to the sound level meter and are highly portable devices.

Table I describes typical noise problems and the sound measuring and analyzing equipment required for diagnosis. A sound meter for a preliminary survey of noise conditions is not expensive. A complete sound measuring and analyzing system for noise control purposes of course is more costly. All of these instruments are relatively simple to operate, and a few hours study of the manufacturer's instruction manual is the only technical education required.

• •

Establishing a Noise Control Program

A complete noise control program, of course, consists of far more than taking sound level and frequency readings. Both "people" problems and engineering problems are present. Fortunately, the good safety engineer or industrial hygienist has developed considerable finesse in persuading and handling executives, supervisors, foremen, and workers. Fortunately again, at least 90 percent of the engineering problems (involved in controlling noise) can be solved with common sense solutions.

The first step is a general plant and office survey to determine the nature and extent of noise levels. All readings should be carefully logged as to noise level,

instrument used, location, date, etc., and preserved for possible use in compensation hearings. Readings should be taken at the ear position of both production and office machine operators, as well as at least once in every 500 sq. ft. of factory space.

Noise levels above 85 db must be considered potentially dangerous and frequency analysis is indicated. As pointed out in Table II, noise levels above 85 in the critical—300 to 4800 cps—range can cause hearing damage after prolonged exposure. Continuous noise levels above 100 db will cause hearing loss regardless of frequency components.

Next, the principal source or sources of offending noise levels must be pinpointed for analysis and control—for example, is our problem due to machine noise or general building vibration, which machine, etc. Measuring and analyzing equipment is indispensable in helping to develop and evaluate potential solutions. In general, one or more of the following six solutions will be used for every noise problem:

1. Elimination of the noise at its source—for instance, by bolting down loose covers.

2. Isolation of the source—for instance, by enclosing a machine in a heavy dense material.

3. Vibration isolation—for instance, by using shock mounts.

4. Absorption of direct noise radiation—for instance, by using acoustical materials on walls and ceilings.

5. Individual protection—by using ear plugs or muffs.

Each noise source must be thoroughly investigated to determine which solution or solutions apply.

Summing Up

Few companies will admit they have a noise problem. Nevertheless, a problem it is, and it is increasing in importance. Compensation claims for job-induced hearing loss cost U. S. industry $2 million last year. One particular case in Michigan recently resulted in a $25 thousand award. Although compensation for hearing loss is not broadly applied in most states, a trend seems to be building up. Missouri and Minnesota, for example, recently broadened previous interpretations of the compensation law to permit payment for hearing loss. Ohio is expected to follow suit shortly.

By taking simple, inexpensive, preventative measures today, compensation nightmares may be totally avoided in the future. And the positive benefits of increased safety, improved morale, and higher worker efficiency start paying off immediately.

Pictures by courtesy of H. H. Scott, Inc.

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up with the idea that it would be a pilot operation to encourage other communities in establishing such centers," J. E. Linster, vice president, claims department, pointed out. "Our objective was to bring rehabilitation to the patient instead of bringing the patient to rehabilitation.

"With well-established centers now operating in 90 communities throughout the state of Wisconsin, we have successfully completed our mission," Linster said.

Successful rehabilitation of seriously injured workers requires the coordinated efforts of many medical and vocational specialists, Linster pointed out. Numerous private rehabilitation centers are now able to provide these varied services and many of the cases once considered hopeless are now being restored to active, useful lives.

During its years of operation, the Wausau center provided more than 250,000 treatments for patients from all sections of Wisconsin and nearby states.

Acne Problems of Younger Employees

The industrial nurse can render a service to the younger employees who suffer from the disfigurement of acne and from the resulting emotional problems by suggesting ways of acne treatment.

A successful method of acne control has been described by a Baltimore physician, Dr. Robert H. Siver, in the February 1961 issue of *The Journal of the Medical Society of New Jersey*. The treatment consisted of a schedule of two or three Lactobacillus-preparation tablets given three times daily with milk over a period of eight days. After a rest period of two weeks, the regimen was continued and repeated as many times as necessary. The patients were also instructed in the need for good cleansing of the skin.

Most patients showed some response during the first two weeks. In 300 cases treated, Lactobacillus tablets were effective for 80 percent of the patients. In the remaining 60 cases, the acne persisted or the patients failed to follow the regimen. Half of the "effective" group had a good to excellent response; and the other half showed a "reasonable" response. The latter ranged up to 25 years in age and typically had had a history of acne for several years.

During early therapy some of the patients developed a temporary aggravation and increased redness of the skin, but the condition improved as the therapy was continued.

While acne, a sebaceous gland disfunction, is primarily a skin disease of adolescents, it may account for as much as 75 percent of the skin eruptions among the young adult and adolescent population. Advice on the control of so prevalent a skin condition is therefore within the province of industrial medical personnel. Anything that medical people can do to lessen the emotional problems of employees is beneficial to their safety and health.

Detailed literature on the use of Lactobacillus tablets for the treatment of acne is available. A source for copies of this literature can be obtained on inquiry to the Editor.

MAINTENANCE

Preventive Maintenance A Safety Key

Regular preventive maintenance and standard operating procedures can greatly reduce yard accidents, the Institute of Scrap Iron & Steel points out to its members in its current Safety Management Brief. The memorandum suggests that a plant's Safety committee can and should be primarily employed to educate and inspire employees regarding safety. This is possible if proper safety and maintenance procedures are already established. It noted that many committees are used to find weaknesses in these programs rather than carry out their basic educational function.

The Brief urges that safe work methods and devices be clearly specified and preventive maintenance schedules set for all equipment and yard facilities. Then, the publication continues, the Safety committee can concentrate on checking for hazards arising from the use of new equipment or changes in working methods.

Examples of Hazards

The Brief's examples of reports by Safety committees are:

1. Trash and waste materials piled in walkway—recommend that they be removed. This was a "safety" problem only because Standard Operating Procedures (S.O.P.) had not been established, or followed, in designating a specific place for trash. If procedures for trash disposal had been developed and supervisors and workers advised of these procedures, the "hazard" would have been prevented.

2. Using flammable liquid to wash machine parts—recommend that liquid be kept in safety can. Here is another place where a S.O.P. should have specified that flammable liquids be kept in safety cans—and the cans provided. This hazard would have continued if not brought to light by the Safety committee—but it shouldn't have existed in the first place.

3. Holes in roadway causing material to fall off trucks—recommend holes be filled in. This is a case of lack of Preventive Maintenance, of allowing an unsafe condition to develop.

4. Broken wires in crane cable—recommend cable be replaced. A proper Preventive Maintenance program would include the inspection of crane cables at regular intervals. If not found in the Safety committee's inspection this could have resulted in a serious and expensive accident.

The Techniques of Plant Maintenance

Publication of the 12th volume of *Techniques of Plant Maintenance & Engineering* has been announced by Clapp & Poliak, Inc. The annual volume is a verbatim report of the Plant Maintenance & Engineering Conference, held in Chicago in January of this year, in conjunction with the Plant Maintenance & Engineering Show.

Bound in cloth-on-board, with 349 pages, 8½ x 11", it is the most extensive treatment of the subject ever published in this series. It contains the texts of 37 papers, illustrated by 114 charts, diagrams and tables, and supplemented by the discussions of 607 questions presented by the audience. In addition, the verbatim discussions of 155 subjects in 11 industrywide "problem sessions" are included.

The book, priced at $10 postpaid, may be obtained from Clapp & Poliak, Inc., 341 Madison Av., New York 17, N. Y.

Subjects Covered

The informal "problem sessions" cover plants in the automotive, chemical, electronic equipment manufacturing, textile, cement, metalworking and metal fabricating, paper, petroleum processing, food processing, research and development, and steel industries.

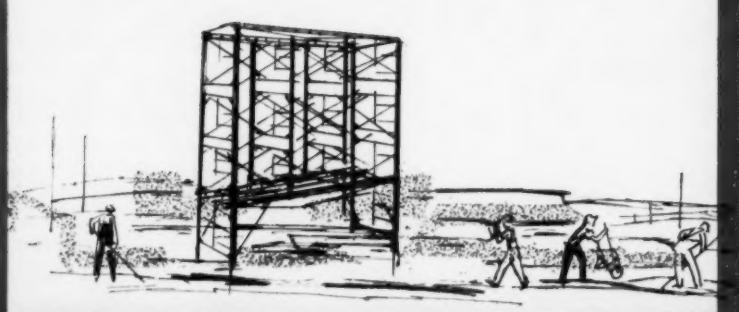
Papers presented included, "A Ten Year Improvement Program," "The Scope of the Plant Engineering Function," "Plant Engineer's Responsibility for Building Design and Construction," upkeep of control instruments, work sampling, maintenance welding, accounting for maintenance costs, preventive maintenance, cleanliness in the "white room," maintenance of automatic machine control, outside contracting, maintenance training, plant engineering in the small plant.

Also, "Getting the Most Out of Industrial Trucks and Batteries," managerial control, central maintenance control of satellite plants, evaluation of performance, power systems, new materials and products for maintenance, keeping contamination out of air and water, cost control, yard and ground maintenance, incentives and work measurements, and "Plant Engineering Responsibility in Plant Start-Up."

STEEL SCAFFOLDING SAFETY

Following are some common sense rules designed to promote safety in the use of steel scaffolding. These rules are illustrative and suggestive only, and are intended to deal only with some of the many practices and conditions encountered in the use of scaffolding. The rules do not purport to be all-inclusive or to supplant or replace other additional safety and precautionary measures to cover usual or unusual conditions.

1. **Post These Scaffolding Safety Rules** in a conspicuous place and be sure that all persons who erect, dismantle or use scaffolding are aware of them.
2. **Follow Local Codes, Ordinances** and regulations pertaining to scaffolding.
3. **Inspect All Equipment Before Using**—Never use any equipment that is damaged or deteriorated in any way.
4. **Keep All Equipment In Good Repair.** Avoid using rusted equipment—the strength of rusted equipment is not known.
5. **Inspect Erected Scaffolds Regularly** to be sure that they are maintained in safe condition.
6. **Consult Your Scaffolding Supplier When In Doubt**—scaffolding is his business.. **NEVER TAKE CHANCES.**



A. PROVIDE ADEQUATE SILLS for scaffolding posts and use base plates.

B. USE ADJUSTING SCREWS instead of blocking to adjust to uneven grade conditions.

C. PLUMB AND LEVEL ALL SCAFFOLDS as the erection proceeds. Do not force braces to fit—level the scaffold until proper fit can be made easily.

D. FASTEN ALL BRACES SECURELY.

E. DO NOT CLIMB CROSS BRACES.

F. ON WALL SCAFFOLDS PLACE AND MAINTAIN ANCHORS securely between structure and scaffold at least every 30' of length and 25' of height.

G. FREE STANDING SCAFFOLD TOWERS MUST BE RESTRAINED FROM TIPPING by guying or other means.

H. EQUIP ALL PLANKED OR STAGED AREAS with proper guard rails, and add toeboards when required.

I. POWER LINES NEAR SCAFFOLDS are dangerous—use caution and consult the power service company for advice.

J. DO NOT USE ladders or makeshift devices on top of scaffolds to increase the height.

K. DO NOT OVERLOAD SCAFFOLDS.

L. PLANKING:

1. Use only lumber that is properly inspected and graded as scaffold plank.
2. Planking shall have at least 12" of overlap and extend 6" beyond center of support, or be cleated at both ends to prevent sliding off supports.
3. Do not allow unsupported ends of plank to extend an unsafe distance beyond supports.
4. Secure plank to scaffold when necessary.

M. FOR ROLLING SCAFFOLD THE FOLLOWING ADDITIONAL RULES APPLY:

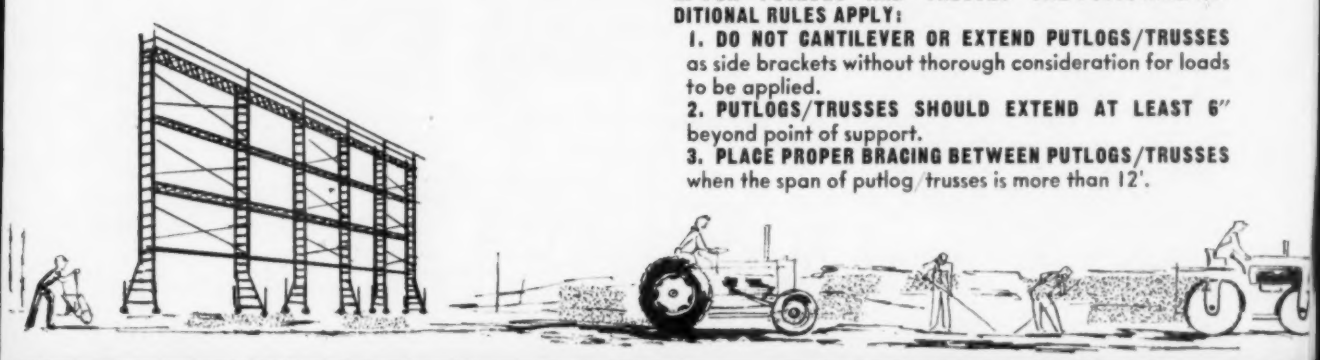
1. **DO NOT RIDE ROLLING SCAFFOLDS.**
2. **REMOVE ALL MATERIAL AND EQUIPMENT** from platform before moving scaffold.
3. **CASTER BRAKES MUST BE APPLIED** at all times when scaffolds are not being moved.
4. **DO NOT ATTEMPT TO MOVE A ROLLING SCAFFOLD WITHOUT SUFFICIENT HELP**—watch out for holes in floor and overhead obstructions.
5. **DO NOT EXTEND ADJUSTING SCREWS ON ROLLING SCAFFOLDS MORE THAN 12".**
6. **USE HORIZONTAL DIAGONAL BRACING** near the bottom, top and at intermediate levels of 30'.
7. **DO NOT USE BRACKETS ON ROLLING SCAFFOLDS** without consideration of overturning effect.
8. **THE WORKING PLATFORM HEIGHT OF A ROLLING SCAFFOLD** must not exceed four times the smallest base dimension unless guyed or otherwise stabilized.

RULES

as Recommended by Steel Scaffolding & Shoring Institute

N. FOR "PUTLOGS" AND "TRUSSES" THE FOLLOWING ADDITIONAL RULES APPLY:

1. **DO NOT CANTILEVER OR EXTEND PUTLOGS/TRUSSES** as side brackets without thorough consideration for loads to be applied.
2. **PUTLOGS/TRUSSES SHOULD EXTEND AT LEAST 6"** beyond point of support.
3. **PLACE PROPER BRACING BETWEEN PUTLOGS/TRUSSES** when the span of putlog trusses is more than 12'.



Industrial Building Exposition and Congress

Nineteen conference sessions, covering virtually every major problem which both large and small companies face when they construct new facilities, will feature the second Industrial Building Exposition and Congress. The twin events are scheduled for the New York Coliseum, Sept. 25 through 28. Modernization, as well as new construction, will be considered.

Eight Types of Exhibits

Two floors of exhibits will complement the discussions. Eight major categories will be covered in the exhibits. These include structural materials and components; mechanical components and equipment; electrical components, materials and systems; heating and air handling; employee services; plant sites and services; financing, and auxiliary services.

The congress will open with a discussion of "Top Management's View of Industrial Buildings." After that, aspects of a plant location study will be considered in three parts. Methods of evaluating contracts similarly will be considered in three parts. Completing the first day's schedule will be talks on leaseback financing consideration of initial cost and ultimate costs in the light of a company's requirements.

Physical Plant

The second day's topics will include design and construction approaches in other countries; heating, ventilation and cooling in modern plants; the effect of building design on employee morale and productivity; the selection of architect and builder for foreign work; efficient and economical lighting; systems to compare standard foot costs; converting old utility systems to larger needs, and planning expandability into a plant.

On the third day, "Developing More Effective Procedures for Construction of Industrial Buildings" will be divided into three parts: estimating, designing suitable facilities and reducing construction delays. "Effective Procedures for the Owner Who Builds Infrequently" will be considered in terms of deciding on what to build; selection of architect and builder, and coordination to control costs and schedule. Still another three-part topic, "Management of the Company's Engineering Staff for Facilities," will be divided into: the engineering department's relationship to the rest of the company; relationship with outside architects, engineers and builders, and control of costs and schedule.

"... And you are the one who is always complaining about MY housekeeping!"

Other Subjects

Other topics will be "From Management Decision to Operation In One Year"; low cost methods for modernization; when to modernize and when to build a new plant, and making more effective use of building models.

A session on construction methods and materials will consider five aspects: longer life from slab-on-ground concrete industrial floors, prestressed steel, curtain walls, structural foams and reinforced fibers, and aluminum.

Visitors who plan to attend may obtain rapid registration cards, congress programs and hotel information from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Hazardous Waste Disposal

The latest in a series of safety guides, SG-9, on the disposal of hazardous wastes, is now available from the Manufacturing Chemists' Association, Inc. The pamphlet outlines recommended safe practices and procedures for disposal of flammable liquids, toxic and corrosive materials and other substances which may create an air or stream pollution problem.

The safety guide recommends that both a "hazard index" and a "disposal index" be established which would set out both the hazards of the waste material and the proper method for disposal.

The safety guide also urges that all waste disposal procedures be placed under the responsibility of one individual or department and that the plant safety organization act in a consultative capacity. Cooperation of the industrial hygienists or medical division also is required, the safety guide states.

The pamphlet describes several methods of disposal including open burning, burning in incinerators, disposal through sewers, and disposal by burying.

SG-9 is available from the Association at the headquarters office, 1825 Connecticut Ave., N. W., Washington 9, D. C. for 20 cents a copy.

Not Enough Water

(from page 37)

ing. An automatic rate-of-rise detector, also installed within the housing, triggers off the device and results in total flooding of the area with dry chemicals.

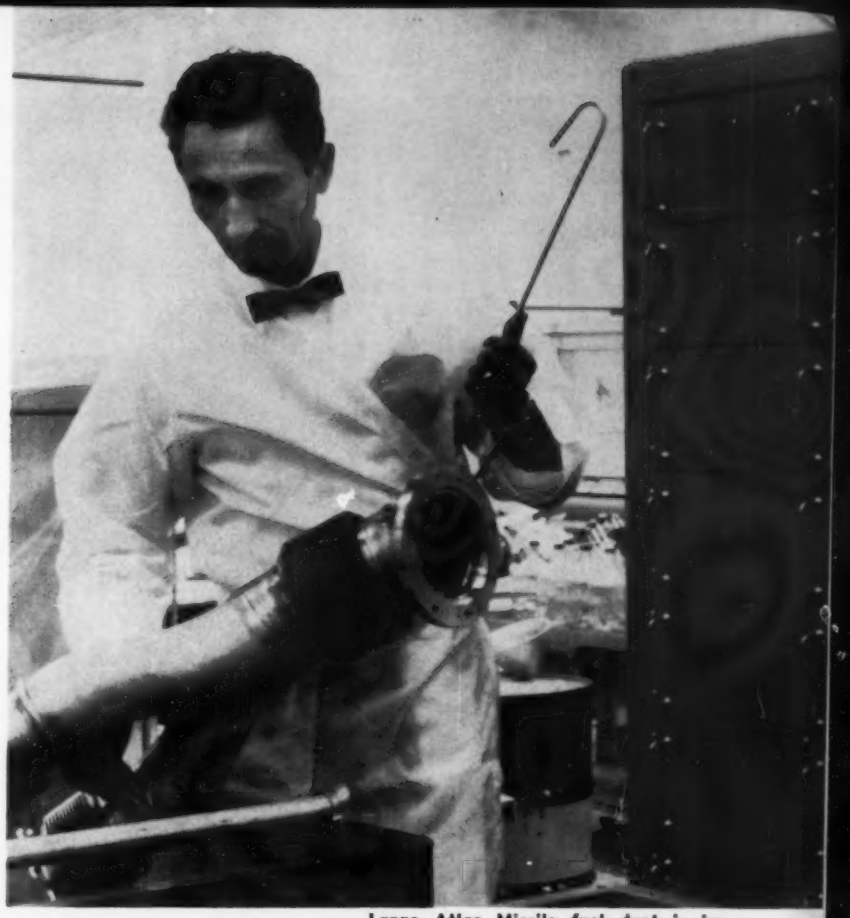
The system can be installed easily by the regular maintenance crew.

Sinclair has only had one system go off—and this was set off accidentally by a repairman. Clean-up and re-fill time was brief, indicating that even after an actual fire, the systems could be returned to service without a significant lapse in protection. Mr. Myers pointed out that this is especially important where, in an emergency, outside communications depend upon electrical power.

Pictures by courtesy of Ansul Chemical Co.

Clean As A Missile

Missile parts must be cleaner than a whistle. Ultrasonic cleaning solves the problem.



Large Atlas Missile fuel duct is immersed in powerful ultrasonic cleaning system at Convair Astronautics.

The largest and most powerful ultrasonic cleaner of its type in commercial use now cleans critical Atlas missile parts in half the time previously required by conventional methods. This new system was designed especially for Convair (Astronautics) Division of General Dynamics Corp., in San Diego, California.

The system utilizes a newly developed, fully-transistorized generator in modular form, delivering 25,000-watts power to the cleaning tanks.

Only three buttons ("clean," "rinse," and "off") are necessary to operate 25,000 watt ultrasonic cleaning system.

Installed near the Atlas ICBM assembly line at Convair, the ultrasonic cleaner is used to clean large fuel and liquid oxygen system parts for the Atlas and Centaur missiles, for which absolute cleanliness is a necessity. The slightest contaminant unremoved in the cleaning process when exposed to liquid oxygen will cause an explosion or a serious missile failure.

The large cleaning system consists of two 500-gallon transducerized tanks, one for "clean" and the other for "rinse," that are alternately activated by the 25,000-watt generator. Upon activation, high-frequency sound waves flash through the cleaning or rinsing solutions in the tanks, setting up a powerful scrubbing action known as "cavitation."

Cuts Cleaning Time

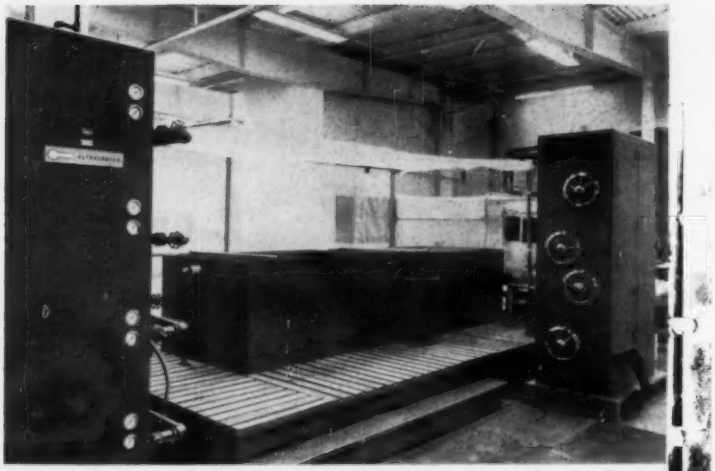
The ultrasonic cleaner plays a dominant role in a new Convair-Astronautics "white room," according to Merl Goodhart, general foreman of the Sheet Metal Section at Convair Astronautics. He estimates the special sonic cleaner does a better cleaning job and in half the time previously required.

Former cleaning methods consisted of pressure flushing the missile parts in a soap tank and a rinse tank, then applying a lot of good old "elbow grease" in hand-scrubbing.

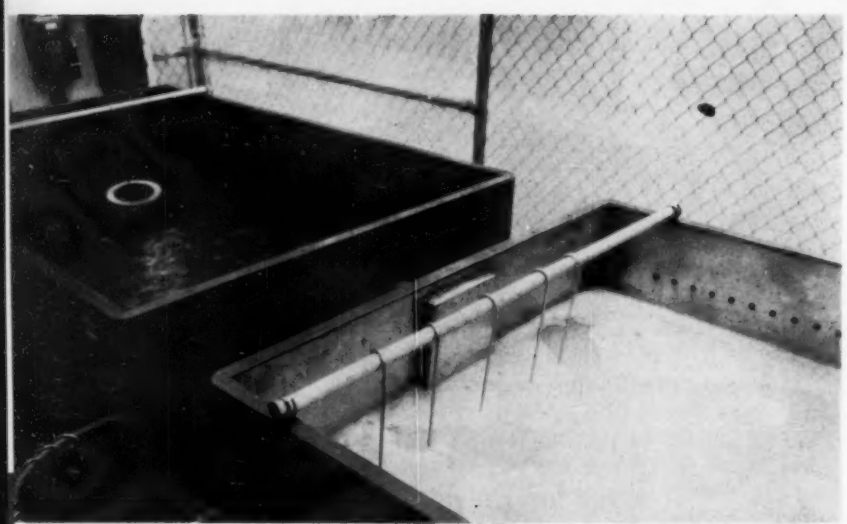
Ultrasonics Used Before

No newcomer to ultrasonic techniques, Convair has been using other off-the-shelf ultrasonic cleaners for several years.

The new 25,000-watt generator operates at a frequency of 20-kilocycles. A major breakthrough over older vacuum tube systems, it provides simplicity of operation at low cost through automatic tuning and assures maximum cleaning power at a constant rate. It affords an 80 percent reduction over conventional generators and utilizes a specially-devised semiconductor circuit that eliminates tuning adjustments and meter readings. The units react instantly and automatically



Over-all layout of cleaning system: Automatic recirculator at left, two 500 gal. tanks (scrub and rinse) in center, and generator on the right.



A closeup of the 500 gal. tanks which comprise the heart of the powerful, automatic ultrasonic cleaning system.

compensate for changes in both load and liquid levels.

Recirculator

The new system also contains a recirculator which completely pumps, filters, and heats the liquid in either tank before the liquid reenters the tank on its return cycle. Replaceable filter cartridges are used in the recirculator, allowing for filter sizes ranging from 1 to 50 microns, as well as automatic indication when filters need replacement.

Pictures by courtesy of Acoustica Associates.

Standards Conference

The advantages of safety standards as seen on the economic, regulatory and nuclear science levels will be explored by safety authorities during the American Standards Association's 12th National Conference on Standards planned October 10–12 at Houston, Texas. Open to all companies and industries, the three-day meeting will include sessions devoted to materials handling, plastics, purchasing, data processing, a case history of industry growth through standardization and safety.

Sponsored by the Gulf Coast Chapter of the American Society of Safety Engineers, an afternoon session on October 11 will explore the advantages of safety standards. E. C. McFadden, vice-president of the Texas Employers Insurance Association, Dallas, will serve as session chairman.

"The Economics of Safety Standards" will be discussed by H. A. Hansen, safety engineer of the Diamond Alkali Company, at the opening of the session. In subsequent addresses J. U. Parker, safety engineer of the Humble Division of the Humble Oil and Refining Company, will cover "Regulatory Safety Codes" and Harvey A. Wagner, assistant vice-president of the Detroit Edison Company and member of the ASA N6 sectional committee on reactor safety, "American Standards for Nuclear Safety."

Use of Standards

The philosophy and practice of standards as applied in company, industry, technical society, government and American Standards will be highlighted in another session. The second part of this session will be devoted to international standards as developed by the International Organization for Standardization, the International Electrotechnical Commission, the Pan-American Standards Committee and the American-British-Canadian-Engineering Unification Conference.

Two gold medals awarded annually by the American Standards Association for outstanding support of voluntary standardization and devoted service to standardization, the Howard Coonley and Standards Medals, will be presented during the awards luncheon on October 11, preceding the session on safety. Vice Admiral W. F. Raborn, USN, chief of the Polaris program, will be the guest speaker at the luncheon.

Participation at the national conference and its sessions is open to all companies, trade associations, technical societies, and government departments and agencies interested in standards work. Information concerning the program of activities and registration blanks may be obtained by writing the American Standards Association, 10 East 40th Street, New York 16, N. Y.

inside the trade

Howard Fairhurst has been appointed Manager, Installation & Service Department, Industrial and Marine Division, *WALTER KIDDE & COMPANY INC.* He joined Kidde in 1935. This department supervises installation and service activities for smoke detecting and fire extinguishing systems for ocean-going vessels and other commercial craft at all principal ports on the West, Gulf and East Coasts.

The Industrial and Marine Division also announces the appointment of *Ray Smith* as Northeastern Regional Manager. Mr. Smith will be responsible for sales of Kidde fire detecting and extinguishing equipment in all of New England and New York State. He will maintain offices at 2284 Washington Street, Newton Lower Falls, Mass. He joined Kidde in 1960 and previously served as Manager, National Accounts and Government Liaison, Industrial and Marine Division.

Appointment of *Vincent P. Greeley* as manager of the New England region has been announced by Walter G. Roe, manager—sales of *J. B. NOTTINGHAM & CO., INC.* Mr. Greeley is responsible for sales and service of portable equipment for multi-arc welding, stress relieving, and power distribution in the New England states. His office is at 697 East Sixth Street, South Boston, Mass.

IPCO Safety Products Co., Orange, N.J., distributor of safety equipment, has been appointed as distributor of the *EDMONT GLOVE CO.* and the eye, ear, and respiratory items of *WILLSON PRODUCTS.* This distribution of Edmont and Willson products by IPCO is in addition to the extensive area already covered by the IPCO affiliate, Industrial Products Company in Philadelphia.

AMERICAN LAFRANCE, a Division of Sterling Precision Corporation, announces the appointment of a new distributor for its complete line of fire extinguishers, fire protection systems, fire hose and fire fighting chemicals in the Chicago Area. This newly formed distributor, American LaFrance Sales and Service of Chicago, Inc., is headed by *Earl A. Larson* and *Dudley R. Styles.* Both men were formerly members of the factory sales staff. Mr. Larson was formerly Chicago District Manager. In forming their own company, they plan to continue the complete sales and service, including recharge service, that has been typical of the American LaFrance representation in the past. William Daniels, present Service Manager, and Mrs. Elizabeth Nemeth, present Chief Clerk, will continue in these capacities with the new company.

The new company will cover thirteen nearby counties in addition to Chicago. It will occupy the present office space at 445 North Lake Shore Drive, Chicago 11, Illinois.

Darrell E. Albert has been named manager, Chicago District Sales Office of *MINE SAFETY APPLIANCES CO.*, Pittsburgh. Formerly product line manager of gas masks and respirators at the company's headquarters, he replaces *C. R. Dever* who has been transferred to Pittsburgh as manager of sales promotion. Mr. Albert will direct sales, service, and consultative activities for the company's full line of products in a territory covering all of Illinois and Wisconsin, and parts of Indiana and Michigan.

Cy Turner

THE RED WING SHOE CO., Red Wing, Minnesota, announced the appointment of *Cy Turner* as head of its newly formed "Safety Wing" Safety Shoe Division. In addition to sales, Mr. Turner will also direct product research and development. Mr. Turner states that the new division's safety shoes are backed by the company's more than 55 years of experience in manufacturing a high-quality line of service boots, shoes and oxfords. Safety shoes have been an integral part of the Red Wing line for the past 25 years.

Harvey Childs, Jr., has been elected vice president of sales for the *Iron Age Safety Shoe Division, H. CHILDS & CO., INC.* The new vice president joined the company following his graduation from Yale in 1947. He became sales promotion manager of the Iron Age Division in 1954 and was named sales manager three years later.

THE EAGLE-PICHER CO. has announced the retirement of *Ed Lowe Gouedy* as advertising manager and the appointment of *William F. McCarthy* to replace him. Gouedy had been with the company for 39 years, heading its advertising activities for most of that time. McCarthy has been assistant advertising manager for the past several years.

ISOCHEM RESINS CO. has announced the appointment of the Panther Sales Co. of 125 No. 14th St., Paterson, N. J. as their Metropolitan representatives in New York and New Jersey for the electrical and industrial trades. *Jon K. Yancey*, president of Panther Sales, will be in charge of the sales of the Isochem Resins lines.

Isochem has also appointed Garland-White & Company, P. O. Box 1683, Oakland 4, Calif. as sole distributors to the building construction and maintenance trades. *W. C. Burns* will be sales manager of their Western Division which will sell in: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

The appointment of *C. R. Payne* as exclusive sales and service representative in the Columbus, Ohio territory has been announced by *LEWIS-SHEPARD PRODUCTS INC.*, producer of electric fork lift trucks and related materials handling equipment. Complete facilities, including parts stocks and service, are at 4029 E. Main Street, Columbus 13, Ohio.

Robert L. Ryan has been named Sales Manager of the Industrial Equipment Divisions of *Lincoln Floor Machinery Co.* and *Wilshire Power Sweeper Co.*, both divisions of *AMERICAN-LINCOLN CORP.*

Associated with American-Lincoln for the past three years, Mr. Ryan started as Regional Sales Manager and, later, Assistant Sales Manager. He will be responsible for conducting sales and service meetings for the company's more than

150 distributors and will maintain close contact with key users of automatic floor scrubbing equipment and power sweepers in the industrial and institutional markets. He will be assisted by three regional sales managers in addition to a staff of sales and service engineers. His headquarters will remain in Toledo.

ARCADE FIRST AID SUPPLY CO., supplier of medical first aid equipment to industry in the West, has announced the appointment of four new regional sales managers: *Charles Cocuzza*, for Arizona, with headquarters in Scottsdale; *Raymond Schaal*, for Utah, with offices in Salt Lake City; *Richard Keller*, for Colorado, with headquarters in Denver; and *Bryce Dewey*, for Nevada, with offices in Reno.

Established nine years ago, with headquarters in San Francisco, the company has grown under the direction of Jack Turner, president, to where today it is the largest firm of its kind in the West.

Arcade offers industry industrial safety consultation and safety films without obligation or charge and also trains key personnel in plants and offices in first aid upon request. Offices in California are located at Tipton (Fresno), Bakersfield, Stockton, Sacramento, Eureka, Menlo Park, and San Francisco.

Raleigh E. Utterback has been named West Coast district manager for closed circuit television equipment sales by *GENERAL ELECTRIC'S Technical Products Operation.* Utterback comes to the Coast from Technical Products' headquarters in Syracuse, N. Y. He is establishing a new district office in the Company's communication sales center at 565 Broadway in Redwood City, California.

Roy Perler, veteran of nine years' sales experience with Yale Materials Handling Division, *THE YALE & TOWNE MFG. CO.*, has been appointed manager of the company's New York Sales and Service Branch by Louis W. Jander, manager of marketing. For the past three years, Mr. Perler has been regional sales manager in the Northeast United States and Canada. Mr. Perler will now direct all sales and service activities on Yale industrial lift trucks and tractor shovels in metropolitan New York, Long Island and Westchester and Putnam Counties.

The Simplex Sales Co., Inc., 1415 S. E. 10th Avenue, Hialeah, Florida, has been named franchised representative for Yale industrial lift trucks and tractor shovels. Under the direction of *James V. Boyett*, the new Yale franchise facility comprises a service shop area, parts inventory and office space. Service activities are under the direction of *Jack Wilcox*.

BELL & GOSSETT CO., Morton Grove, Ill., has announced two new appointments in its Refrigeration and Air Conditioning Department of the Hydro-Flo Division. *Joe Flasch*, previously sales manager of the department, has been named product manager and will be in charge of coordinating production, engineering and sales activities. *Carl Rice* was appointed field sales manager from his previous position as production application engineer.

Appointment of *John B. McPherson* as National Sales Manager of Technical Products, *FLEXIBLE TUBING CORP.* was announced by Frederick K. Daggett, president. Mr. McPherson will be in charge of all sales activities of the Division, including direction of sales personnel and the formulation of advertising and sales promotion policies. He was previously manager of industrial sales, Electric Boat Division, General Dynamics, and was vice president and chief of development for Air Shields, Inc.

The appointment of *Crane Products Mfg. Co., Inc.*, Las Vegas, Nevada, as exclusive worldwide sales and service representative, with the exception of Canada, for its automatic electronic warning safety device for all boom equipment, has been announced by *WINTRONICS*. The address of the Crane organization is 3549 South Industrial Road.

Frank E. Massard has been appointed manager of advertising of *The Carborundum Co.*, Niagara Falls, N. Y., according to an announcement by Frederick T. Keeler, director of marketing. Mr. Massard, who succeeds Burchard M. Day who has resigned from the company, holds an A.B. degree in Journalism from the University of Colorado. He has served the company as assistant editor, in materials control and buying positions, as sales publication editor, account supervisor, and assistant manager of advertising, the position he held at the time of his recent promotion.

Appointment of *Edward A. Romanak* as manager of the Educational Service Bureau of *Central Scientific Co.*, Chicago, was announced by L. A. Miller, Jr., Vice President-Marketing. His professional background includes some twenty years as a science teacher and school administrator of secondary schools. He is a degree graduate of the University of Notre Dame.

The company has also announced the appointment of *Dexter Peterson* as a sales representative in Arizona, New Mexico, and Clark County, Nevada. Peterson, who will headquarter in Los Angeles, graduated in 1959 from Mankato State College, Mankato, Minn., and attended the University of Minnesota Medical School for one year.

Safety Appointments

Dr. Robert P. Sim has become medical director of the Esso Standard Region, Humble Oil & Refining Company, succeeding Dr. Leo Wade, Esso medical director since 1951, who recently accepted a post with the Sloan-Kettering Institute for Cancer Research as vice president for administration.

Dr. Sim has been assistant Esso medical director for marketing since 1953 and currently is serving also as physician for the New York State marketing headquarters. He was physician for Esso's New Jersey marketing area in 1956 and 1957.

A 1934 graduate of the College of Physicians and Surgeons, Columbia University, Dr. Sim joined the medical department at Esso headquarters in New York City in 1938. He has worked almost entirely since then on the development and administration of medical programs for Esso field marketing units from Maine to Louisiana.

He is a member of the faculty of the Cornell University Medical College, New York City, a member of the executive committee of the New York State Society of Industrial Medicine, a member of the Council on Graduate and Undergraduate Education of the American College of Preventive Medicine and chairman of the council's subcommittee on occupational medicine, and a member of the committee on standards for safe driving of the Industrial Medical Association.

Al Zirkes has joined Wyle Laboratories in the new position of Staff Engineer for Safety. Mr. Zirkes was formerly with Marquardt Corporation, Van Nuys, California, as health physicist in charge of radiation and toxic materials safety, and previously with Curtiss-Wright Corporation and Westinghouse Electric Corporation in their atomic energy programs.

He will be in charge of Wyle's safety program at all the Company's Divisions. He has a B.S. degree from City College of New York and has taken graduate courses in Occupational and Radiological Health.

John W. Hatfield

John W. Hatfield, safety engineer during the past quarter century for the Ford City, Pennsylvania (Works 6) plant of Pittsburgh Plate Glass Company's Glass Division, died last May in Kittanning, Pa. Mr. Hatfield, 64, had been associated with Pittsburgh Plate for 41 years during which he served in various supervisory capacities. He had been actively engaged in the industrial safety field, serving for more than 20 years as a member of the National Safety Council.

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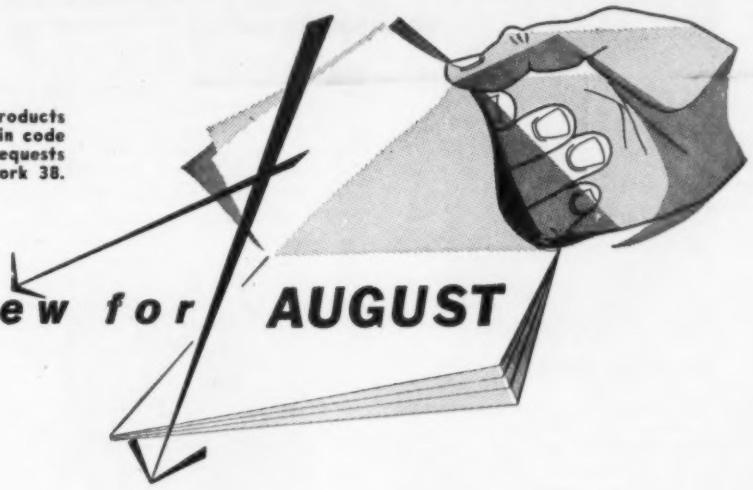
To obtain descriptive literature of products listed, use Reader's Inquiry Card. Write in code number given each item. Send written requests to: Service Dept., 75 Fulton St., New York 38.



what's new for AUGUST

DISPOSABLE SWEATBANDS

(Use Key # 699 on Inquiry Card on page 33)

A DISPOSABLE feather-weight sweatband of white gauze and cotton holds up to ten times its weight in moisture and is cool, light, and comfortable. Workers scarcely know they are wearing it. A free sample is offered by General Bandages, Inc.

EMERGENCY COLD PACK

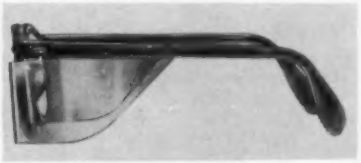
(Use Key # 700 on Inquiry Card on page 33)

THE PROBLEM of producing an ice pack for emergency purposes when no ice is readily available is solved by Kwik-Kold—a plastic package of chemicals that becomes an instant cold pack for fast first aid treatment. It provides 20°F. cold within two seconds after being activated by simply squeezing the package. It stays that cold for about 30 minutes, the critical period in preventing swelling, pain and discoloration resulting from an injury. A product of International Latex Corp., Kwik-Kold consists of an outer bag containing chemical crystals and an inner bag containing a liquid. A slight pressure on the entire package breaks open the inner bag and the cold is produced when the two chemicals mix. The contents are said to be absolutely harmless in the unlikely event that the outer bag should be punctured. It is designed for first aid treatment of such injuries as sprains, bruises, contusions, fractures, insect and snake bites, and in cases of high fever. The flexible package molds itself to the various parts of the body, and produces a dry cold. Requires no special storage or insulation, and can be stored for more than two years.

HIGH WINDOW WASHER

(Use Key # 701 on Inquiry Card on page 33)

TUCKER Mfg. Co. recently announced the addition of two new "high" window washer models capable of washing windows at heights up to 84 feet . . . while the operator remains safely on the ground. The window washers with telescoping handles can be reduced or separated into sections for washing basement or lower level windows. One man operates the handle, brush and detergent dispenser that regulates the flow of detergent or rinse water. The detergent tablets will not etch paint, stain wood or be injurious to grass or shrubs. Special wide flaring brushes for large, small or rough windows spread out and clean the trim as well as the glass.



FLAT SIDESHIELDS

(Use Key # 702 on Inquiry Card on page 33)

WILLSON PRODUCTS is introducing a new flat, half-type plastic sideshield in crystal clear or green for plastic safety glasses. The new sideshields are cemented to temples and fit spatula or plastic-cable styles. There is no need for the usual plastic flange on the eye wire to attach the side-shields. The Clear-Vue sideshields improve side visibility and ventilation. Compact in design, they are available with Willson safety glasses or separately.

ABRASIVE BLASTING HOOD HAS REPLACEABLE FRONT

(Use Key # 703 on Inquiry Card on page 33)

A DURATEX rubber front apron and inner bib that are zipper-attached to the head-and-shoulder canopy is one of many new features on an improved abrasive

blasting hood announced by the Chicago Eye Shield Company. Either apron or bib can be zipped on or off without replacing the whole canopy. The canopy, also made of the long-wearing rubber, has a full 4½" x 5¼" window opening for increased visibility. Neoprene lens retainer supports laminated backup lens, Perma-Clear cover lens and perforated steel cover plate. The new one-piece hood is available with optional choice of skull cap, hard cap or G-3 Hed-Rite (nylon) headgear with broad bearing cross strap and ratchet adjustment.

Air supply system is designed for low pressure (5 to 25 lbs.). Air travels from air valve assembly mounted on belt through hose which releases air through diffuser bags. Bags filter the air and prevent blowing.

VERTICAL SERVICE CAR

(Use Key # 704 on Inquiry Card on page 33)

MEYER MACHINE, INC. announces the marketing of their new Tulito Vertical Service Car that provides a safe, convenient method of servicing any height structure. The equipment is a free line, constant speed hoist operating on a permanent guide rail installation. The service car itself can be used as either a portable or permanent installation. A hand truck is available to transport the car. Electric or air-powered, the vertical service car is simple to operate—push a button to start, release to stop. It is equipped with an integral, mounted, locking brake that operates automatically when the motor stops. The stainless steel, noncorrosive cable is invisible when not in use. Operating on 110 v., 220 v., or 440 v., single- or three-phase, it carries a live load of 500 lbs.

MULTI-PURPOSE CLEANER

(Use Key # 705 on Inquiry Card on page 33)

TECT, Inc. has announced the addition of Vythene Marine Cleaning Fluid to their line of marine products. The new safer solvent is specifically formulated for removing grease and oil from generators, distributors, ignition wires and other marine engine parts. It contains no carbon tetrachloride, is nonflammable, and low in toxicity. The squirt spout of the 6 oz. can permits effective application to many points such as distributors, wiring and eliminates waste. Other uses include: removal of wax and polish before refinishing brightwork or metal; cleaning all fabrics and upholstery except vinyl; spraying on wet ignition systems for quick starts.

NEW INSECTICIDE & SPRAYER

(Use Key # 706 on Inquiry Card on page 33)

INSECTS resistant to DDT and other chlorinated insecticides can be controlled with Eldrin, a water-emulsifiable insecticide developed by National Chemsearch Corp. Eldrin combines several insecticides, one synergizing the other into a highly efficient, powerful insecticidal compound. Its long lasting residual effect kills all flying and crawling insects. Highly concentrated, this insecticide may be diluted with either water or oil for optimum economy. Diluted with water, it is especially effective for the control of grub worms, chiggers, and other lawn insects without harming trees, shubbery, and grass. For maximum results, National Chemsearch has developed a compact power sprayer called the Dart. The 60-pound Dart dispenses liquid fertilizer and weed killer as well as insecticides. It has adjustable controls for mist, fog, or distance spraying.

FULL LINE OF MULTIPLE PURPOSE EXTINGUISHERS

(Use Key # 707 on Inquiry Card on page 33)

A NEW dry chemical extinguishing agent, effective on Class A, B and C fires, has been introduced by Ansul Chemical Company. "FORAY" is the first multi-purpose dry chemical to be offered in a complete line of hand portable extinguishers and also the first offered in the cartridge type. Available in either cartridge or stored-pressure 8½, 17 and 25 lb. models for flammable liquid, electrical, ordinary combustible fires. Special introductory prices are in effect on conversion kits to adapt most Ansul hand portable extinguishers now in service to the use of "FORAY" dry chemical.

"FORAY" has been granted the highest Underwriters' Laboratories ratings per pound of extinguishing agent yet given to an ABC dry chemical. The 8½ lb. model is the smallest amount of dry chemical to be granted a rating by U.L. for Class A fires. In some cases, "FORAY" has proved to be more effective on flammable liquid fires than standard Ansul dry chemical.

OIL SLICK ANTIDOTE

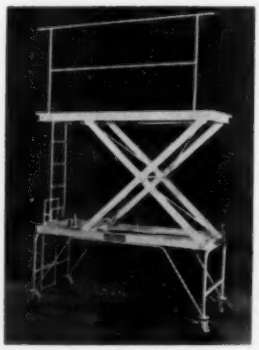
(Use Key # 708 on Inquiry Card on page 33)

A NEW product by Conco Chemical Company disperses oil slicks instantly by chemical action. Conco LCP-12 was designed to combat the oil slick problem in fresh or salt water. Used as a spray after slick appears, or injected at source. Stored at ship channels, ports and docks to combat slicks and oil fires, it disintegrates oil slicks, leaving nothing to burn. Large slicks (one or more square miles) may be sprayed with fire hose or by plane. Non-toxic, harmless to personnel and equipment and to marine life, and non-corrosive.

EXPLOSION PROOF REFRIGERATORS

(Use Key # 709 on Inquiry Card on page 33)

A NEW MODEL has been added to the line of Explosion-Proof Refrigerators made by Kelmore, Inc., the only manufacturer of U.L. listed refrigerators for safe storage of flammable fluids or solids and in areas containing vapors or gases of Class 1, Groups C & D. The new unit, 10 cu. ft., is specifically designed for use in research laboratories in industry, high schools, universities and hospitals; wherever flammable or explosive chemicals are stored or where conditions of the surrounding air are such that explosion-proofing is mandatory. It looks like a kitchen-type refrigerator and plugs into any standard wall socket. The Kelmore units operate in high ambient temperatures, and have no sources of ignition on either the interior or exterior. All arcing devices are inside the explosion-proof motor compressor housing. All wiring and the power supply switch itself are explosion-proofed.



PLATFORM STRADDLES OBSTACLES

(Use Key # 710 on Inquiry Card on page 33)

A NEW "Adjustable Jr." mobile work platform that makes maintenance and repair of equipment located over floor obstacles safe, quick and inexpensive has been announced by The Ballymore Co. The lightweight model AJR, made of steel, is available in several models and clears obstacles up to 44" high and 72" wide. The platform elevates and lowers on a scissoring support frame by means of a "screw type" mechanism. Either hand or electric powered operation is available. A mechanical "pawl type" locking device secures the platform safely at all levels. Access to the non-metallic deck is provided by a telescoping ladder. Has a 36" guard rail at the rear or on all sides.

NON-CONDUCTIVE FIBERGLAS LADDER

(Use Key # 711 on Inquiry Card on page 33)

A NON-CONDUCTIVE Fiberglas-reinforced plastic ladder with polyurethane core, capable of supporting 2,000 pounds, has been developed by American Allsafe Co. Designed primarily for public utilities

and plant maintenance, construction and shipbuilding, its non-conductive property makes it suitable for electrical work. It will not absorb moisture, and requires little or no maintenance. Side rails and rungs are a combination of polyurethane foam core, resin-impregnated parallel longitudinal Fiberglas rovings, and resin-impregnated Fiberglas fabric. The polyurethane foam provides hoop strength to the rung by resisting any tendancy to buckle from tension created by a person standing on it. The foam also excludes moisture from the inner walls of the structure, and helps distribute the bearing load of the rung to the side rail.

LOW COST DUST MASKS

(Use Key # 712 on Inquiry Card on page 33)

LIGHTWEIGHT No. 36 dust masks, packaged in a compact, ten-unit, color-coded carton for easy stacking and cleaner handling, are available from Dockson Corp. Made of pliable aluminum which permits close fitting around mouth and nose contours, these low cost dust masks offer maximum comfort and protection against nuisance dusts. Inexpensive, throw-away, sterilized cotton gauze filters are held snugly against the face, allowing exceptionally free breathing and clear speech. The new box contains ten No. 36 dust masks, and has bright green color-coding for quick identification with boxes of replacement filters. Replacement filters in standard or extra fine filtering are packaged 25 per tight-closing dispensing box.

LAB PLASTIC SAFETY SHIELDS

(Use Key # 713 on Inquiry Card on page 33)

TWO NEW portable models have been added to the line of Lab-Guard laboratory safety shields made by Instruments for Research and Industry. The new shields are both of a compact weighted-base type, but differ in size and shape. Using quarter-inch-thick transparent Plexiglas acrylic plastic, the curved shape provides shielding at the sides as well as in front.

The shields taper towards the top, and are weighted with sheet lead at the base to eliminate the need for protruding feet. The handle on the base and the finger holes drilled through the shield's top facilitate handling.

The acrylic plastic provides strength and shatter resistance, excellent transparency, and chemical and physical stability.

ANTI-STATIC AGENT

(Use Key # 714 on Inquiry Card on page 33)

A NEW anti-static agent stops static electricity from building up on automobile seat covers, plastics, paper, vinyl floor coverings, fabric and metal. Recent applications of E. F. Houghton & Co.'s Anti-Static Agent 575 include treatment of nylon uniforms. The product was added to the rinse water for these uniforms. Untreated uniforms caused a deflection on an A. Bass static meter and a Statigun. The treated uniforms showed no charge.

The product deposits an imperceptible monomolecular film that discharges static electricity into the air, according to Houghton. It can be used in numerous material and assembly applications.

DEERSKIN WELDING GLOVES

(Use Key # 715 on Inquiry Card on page 33)

A LARGER more comfortable welding glove, made of pearl flesh split, Brazilian Jack Deerskin, has just been introduced by the Glove Division of the Riegel Textile Corporation. This leather is exceptionally soft, yet provides excellent wear and withstands heat well. The back of the hand is lined for added insulation and perspiration absorption, and the cuff is fully lined with lightweight suede to prevent chafing. It has an extra-long 6½ inch cuff for arm protection, an extra-large pull patch protects the threads that join the cuff and the glove for longer wear, and another patch on the palm to protect the thumb seam. Other seams are fully welted where metal flow is heaviest.

MEDICATED SKIN CREAM

(Use Key # 716 on Inquiry Card on page 33)

OTIS CLAPP has just put on the market a Greaseless Medicated Skin Cream combining the soothing properties of Obtundia(R) Cream in a specially formulated white greaseless base. It is used to relieve itching, irritation, or pain caused by sun-burn, insect bites, cuts, abrasions, chafing or chapping, etc. Available in ⅓ oz. and 1 oz. tubes.

DISPOSABLE PLASTIC GLOVES

(Use Key # 717 on Inquiry Card on page 33)

SANITARY and disposable gloves, made of Visqueen polyethylene film, are being offered by Research Associates, Inc. as protection for and from the hands. These RA Poly Gloves can be worn for a variety of applications in various industries: In laboratories for general protection from colorants and toxic materials; in the assembly and inspection of bearings or small mechanisms; in greasing and oiling machinery; in the printing trades while cleaning presses or handling paper; for general janitorial functions.

They are made of 1-mil thick polyethylene film and are available in two sizes: Style WA for glove sizes 6 to 8, and Style WB for sizes 8½ to 10½. The film is soft, flexible, moisture proof, odorless and unaffected by most acids or alkalis. Packaged in dispenser-type boxes of 100, 500 and 1,000 gloves.

QUICK-DRYING PAINT

(Use Key # 718 on Inquiry Card on page 33)

TEFLATE, an odorless, quick-drying, durable paint for walls and floors, is now available from Flexrock Co. The product comes in eight attractive colors, plus white, and sets up a moisture barrier that shuts out all water penetration of outside, above-grade walls. It resists chemical fumes, salt water, grease, oil, sea air and general atmospheric conditions in heavy industrial areas. The product is recommended for any surface but wood, and its alkali-proof, dust-repellent finish is non-chipping, stainless and will not flake, blister or peel. Its coverage is approximately 300 square feet per gallon, per coat.

SCALD-PROOF SHOWER VALVE

(Use Key # 719 on Inquiry Card on page 33)

A SIMPLE, inexpensive valve has been perfected to maintain a constant water temperature control for showers and other water outlets to within one degree. The Tempera Valve, made by the Tempera Corporation, is 3⅞ inches long and 3⅛ inches high. It is composed of only four parts, a bronze body, a perforated sleeve, a hex body nut, and a perforated piston, the latter being the only moving part. Not a water mixer, it is a balancing line valve, operated by water pressure. Once the water temperature is adjusted to an individual's taste, and then altered by a water pressure change, the piston will move back and forth, decreasing or increasing the hot or cold water flow, depending on pressure changes in the supply line. Easy to install, it is simply cut into the supply lines wherever convenient; before the shower mixing valves and where line robbing can occur, in any position, at any angle.

FIRST AID FOR ROCKET FUEL BURNS

(Use Key # 720 on Inquiry Card on page 33)

A PHOSPHATE buffer called Neutralize is gaining prominence in the rocket and missile industry as a treatment for skin and eye burns caused by liquid launching fuels. Developed by the E. D. Bullard Co. as an antidote for acid and alkali burns, it washes off and counteracts the outer layer of the chemical, then the danger area (the layer of chemical next to the tissue), and finally, it penetrates the surface to inactive chemicals that water cannot reach. Neutralize is suitable for burns from the hydrazine family of poisons, because they are miscible with water and alcohol, and form salts with inorganic acids. Aniline, also, combines with acids to form salts. Burns caused by fuming nitric acid, kerosene and hydrogen peroxide respond to immediate lavage with either water or Neutralize, but only a small amount of Neutralize is required according to the maker. Available in 2, 4, 8, 32-ounce, 1 and 5 gallon polyethylene bottles.

NEW HEADGEAR FOR WELDING HELMETS

(Use Key # 721 on Inquiry Card on page 33)

A NEW, free-floating welding helmet headgear of plastic fabrication is now being produced by The Fibre-Metal Products Company. The 3-C Headgear is not affected by moisture, is flexible for comfortable conformity to any head, is adjustable for perfect fit. The free-floating design avoids direct head contact with the helmet shell, thus eliminating side pressures or front-to-back pressures by the welding helmet. All metal parts are aluminum for corrosion resistance, light weight and better durability. The new Ratchet Adjustment is designed for a gloved hand.

WIDER RANGE DUST COLLECTOR

(Use Key # 722 on Inquiry Card on page 33)

A WIDER range of more efficient operation is attained with a new series of Model 20 centrifugal dust collectors developed by Torit Mfg. Co. to provide greater capacities under comparatively low horsepower. Capacity of the Series No. 20-3 (3 hp.) ranges from 1,250 to 2,000 cfm, and the No. 20-5 (5 hp.) to 2,500 cfm. Variations include models with after filters for indoor exhausting and enlarged dust storage and

hopper capacities. 12 models are available. Space requirements have been reduced with the new machines. While primarily designed to handle materials like dust, chips, shavings, and blocks from wood, metal and plastics, the Series No. 20 shows excellent efficiency with fine materials such as flour. The blower features a self-cleaning, non-clogging radial design wheel.

The new collector has a long tapering cone design and high inlet velocity. In tests it has separated 99.2 percent of steel grindings, 99 percent of sawdust and 94 percent of flour by weight. It has 8" inlets and 10" outlets. A protective weathercap and weather resistant finish are available for outdoor installations.

SAFETY BENCH CAN

(Use Key # 723 on Inquiry Card on page 33)

THE PROBLEM of cleaning small metal parts in gasoline is solved by a new Safety Bench Can made by Eagle Mfg. Co., and approved by Factory Mutual for industrial use. It has a spring-actuated

dasher which is perforated and flush with the top of the can, to reduce evaporation losses and minimize explosive vapors. The dasher, coupled with baffles, protects contents of the can from fire. The entire can is constructed of heavy-gauge coated sheet steel, with red enamel exterior finish. Available in one- and two-quart and two-gallon sizes.

Also shown is a Dip Can, to be used to reduce fire hazard where a faucet may drip or where a slow leak is likely. Available in two-quart size.

WATER SOLUBLE SOLVENT

(Use Key # 724 on Inquiry Card on page 33)

A NEW concentrated water soluble chemical cleaner, X-1, has been developed by Pipe Line Chemical Co. for cleaning equipment in industrial plants, oil refineries, compressor stations, as well as oil production equipment. It removes grease, soil, vapor stains and light carbon from machinery, engines, and other equipment. It is nonflammable and non-toxic, is not harmful to paint, and leaves no film. Surfaces cleaned can be painted immediately. The concentrate is diluted with water before use for most cleaning and degreasing operations.

BARRIER CREAM AGAINST TAR

(Use Key # 725 on Inquiry Card on page 33)

THESE HANDS, covered with sticky clinging tar (flashing and waterproofing compound) were protected with an invisible film of Kerodex ® #51 protective barrier cream. Hands were washed entirely free of tar compound in 1 minute and ten seconds, using common industrial soap powder. The barrier cream, made by Ayerst Laboratories, prevented pore impregnation by tar, provided a "lifting" action to leave skin clean.

NEW DOOR INTERLOCKS

(Use Key # 726 on Inquiry Card on page 33)

THREE new interlock switches that automatically cut current when the door of a cabinet or enclosure containing dangerous electrical equipment is opened have been introduced by Minneapolis-Honeywell's Micro Switch Division. When the door is closed, the interlock automatically re-energizes the circuit.

For electrical checkouts the interlocks can be set to a maintained-contact posi-

tion, eliminating the need for cheaters or jumpers and the consequent danger that the cheater may be forgotten. When the door is closed, the interlock automatically returns to its regular position, and the next time the door is opened, power is cut.

Three new series of door-interlocks are available. One (the 13AC1) is designed for data processing consoles, transmitters and computers, since it eliminates even momentary power interruptions when the cabinet door is closed.

Up to four separate single-pole double-throw circuits can be controlled at one time with one 8AC1 series door-interlock. Four subminiature precision switches are controlled by the actuating rod. Various on-off combinations can be made by milling certain portions of the rod.

In the 9AC series, the subminiature switches are sealed in an epoxy resin inside the housing, with an elastomer plunger seal bonded to the pin plunger and the metal housing.

VACUUM FEATURES NEW DESIGN

(Use Key # 727 on Inquiry Card on page 33)

A DRY-PICKUP commercial vacuum cleaner of revolutionary new design, Flor-O-Vac, was announced by Nobles Engineering Mfg. Co. A new pickup head design provides one head for hard floors, another for carpeted floors. The pickup head mounts directly to the front of the machine and has a swivel-bellows neck to assure full contact with the floor at all times. Twin dust cartridges are made from special cellulose fiber, and have stiffened tops for easy removal.

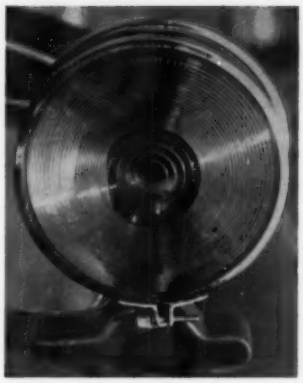
Each cartridge has its own motor which operates at 1,700 rpm and draws five amperes at 115 vac/dc. Weighing only 53 lbs., the Flor-O-Vac is engineered for

maximum portability. The convenient carrying handle is mounted on top. Accessories include a wand assembly and tools for hard-to-get-at places.

EMERGENCY FLASHER FOR CARS

(Use Key # 728 on Inquiry Card on page 33)

A NEW emergency flasher light for passenger cars is announced by R. D. Fageol Co. Known as PC-1, it is for warning use, either day or night. Plugged into the car's cigarette lighter and operating



from the battery, the light is reported to produce over 70 brilliant red flashes per minute in 2 directions (front and rear). It has 4-inch optical plastic fresnel lenses, held in a durable, weatherproof metal head with stainless steel protective rings. Light is said to be visible approximately 1 mile. Dual purpose bracket provides easy attachment to either drip ledge or window of any car. Battery current requirements are negligible and transistor bulb has a minimum life of 500 hours. Lights are furnished complete with 10 ft. of cord and slip-in plug.

TWO-MAN PLATFORM LADDER

(Use Key # 729 on Inquiry Card on page 33)

A HEAVY DUTY platform ladder manufactured by The Dayton Safety Ladder Co. permits two men to work from it at the same time. With wide steps and a roomy work platform on one side, it features on the other side sturdy dowel-type steps reinforced with heavy steel supports for maximum safety. Used in general overhead maintenance and repair work, it eliminates the need for using two separate ladders in many cases. Available in various sizes from 4 to 16 ft. in height, it also features a large work shelf at the top, easily accessible from both sides, for placing tools, boxes, etc. Ladder folds compactly for flat storage and easy carrying. Made from the finest grade Sitka Spruce with corrosion-resistant, cadmium coated hardware.

WATERLESS HAND CLEANER

(Use Key # 730 on Inquiry Card on page 33)

A NEW special process formula Ren Hand Cleaner containing an antiseptic ingredient removes stubborn materials and helps protect the hands by reducing the chance of secondary infection from minor cuts or scratches or infectious dermatitis from oils. Made by Ren Plastics, Inc., the new product is said to dissolve grease, plastic, resin, hardener, paint stains, enamel, tar, tile cement, ink, pigments, gasket cement, dyes, adhesives, glue and other problem soiling agents. With a pleasant wintergreen odor, it also contains ingredients to condition the hands and prevent dry skin. Available in 12 oz. aerosol packaging.

AUTOMATIC DUAL-CHARGER FOR EMERGENCY LIGHTS

(Use Key # 731 on Inquiry Card on page 33)

CARPENTER Mfg. Co. announces a new line of Watchmaster emergency stand-by lights featuring fully automatic dual charging. The new charger maintains the battery at full power during periods of non-use and restores it to full charge within 12 hours after complete discharge. Watchmaster lights automatically provide illumination by means of self-contained battery power, the instant normal lighting current fails. Available on models mounting up to 4 lamp heads on the control unit or remote powering of up to 15 lamp heads from one battery. Range of illumination or time varies up to 30 hours depending upon the number of lamps used.

ICC APPROVED DRY CHEMICAL

(Use Key # 732 on Inquiry Card on page 33)

AN UNDERWRITERS' Laboratories approved 2½ lb. pressurized dry chemical fire extinguisher equipped with a gauge or similar device has full approval of the Interstate Commerce Commission to be carried by buses, trucks and truck tractors. The Fyr-Fyter Company's recently improved gauge-type 2½ lb. "Safety Twin" extinguisher complies with the new ICC requirements. Available in either red-finish steel construction or in chrome-finish brass, it has a 4 B:C rating for both flammable liquid and electrical fires. Featuring a visual pressure gauge, corrosion-proof brass valve, sturdy carrying handle and operating lever, the extinguisher is solidly constructed to take vibration and rough abuse. Measuring 14½" high and weighing 6 lbs., extinguisher is furnished with a matching carrier-style clamp mounting bracket.

Index to Advertisers and their Agencies

Ayerst Laboratories	19	Donaldson Associates, Inc., Huntington
Babbitt Steam Specialty Co.	53	George T. Metcalf Co., Providence
Bullard Co., E. D.	27	Erwin, Wasey, Ruthrauff & Ryan, Inc., San Francisco
Canfield Oil Co.	54	Baisch Advertising Agency, Inc., Cleveland
Coppus Engineering Corp.	53	Chirurg & Cairns, Inc., Chestnut Hill
Federal Sign & Signal Corp.	21	C. Jackson Associates, Wilmette
Gagnon Enterprises	10	
Gets-A-Lite Co.	54	Read Brothers, Chicago, Ill.
Haws Drinking Faucet Co.	17	Pacific Advertising Staff, Oakland
Hynson, Westcott & Dunning	Back Cover	
International Film Bureau	43	
Legge Co., Inc., Walter G.	3	J. M. Kesslinger & Associates, Newark
Wilkins Co., Inc.	Inside Front Cover	Laux Advertising, Ithaca

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(For details, use Key # H-12 on card on page 33)